DP3S series

Closed loop RS485 stepper driver

User manual

Wuxi Xinje Electric Co., Ltd.

Data No. D3C15 20250603EN 1.3

Basic Description

- Thank you for purchasing the Xinje DP3S series stepper drive. Please read this product manual carefully before proceeding with any related operations.
- This manual mainly provides users with relevant guidance and instructions on how to correctly use and maintain stepper drivers. The manual covers the functions, usage methods, installation, and maintenance of stepper drivers.
- The content described in the manual is only applicable to the DP3S series stepper drive products of Xinje Company.

User Notice

This manual is applicable to the following personnel:

- Installation personnel for stepper drivers
- Engineering and technical personnel (electrical engineers, electrical operators, etc.)
- Designers

Before operating or debugging the stepper drive, please read the safety precautions section of this manual carefully.

Responsibility Statement

- Although the content in the manual has been carefully checked, errors are inevitable, and we cannot guarantee complete consistency.
- We will regularly review the content of the manual and make corrections in subsequent versions. We welcome valuable feedback.
- The content described in the manual is subject to change without prior notice.

Contact us

If you have any questions about the use of this product, please contact the agent or office where you purchased the product, or you can directly contact Xinje Company.

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Catalog

1 Product introduction

1.1 Model naming rule

DP3S - 80 8 A

① ② ③ ④

①	Series name	DP3S:	DP3S series cloed loop RS485 stepper driver
②	Maximum peak current of the driver	80:	8.4A
		70:	7A
③	Maximum operating voltage of the driver	8:	80V
		5:	50V
④	Power supply	A:	AC/DC power supply
		None:	DC power supply

1.2 Performance and features

- Using an encoder for position feedback allows for real-time compensation of position deviations, fundamentally solving the issue of traditional stepper motors losing steps.
- The current can be adjusted in real-time according to the load and speed, resulting in smoother operation and lower motor heat generation.
- Compared to open-loop stepping, there is a significant improvement in the motor's high-speed performance.
- RS485 communication and single-axis control functions have been added on top of digital drivers.
- Utilizing an RS485 network interface and Modbus RTU bus protocol to achieve real-time control and data transmission of the stepping system.
- RS485 communication cables replace traditional pulse direction signal cables, simplifying wiring and significantly reducing cable, labor, and maintenance costs.
- RS485 station number and baud rate can be adjusted via dip switches and upper computer debugging software.
- Configured with 6 signal inputs and 2 signal outputs to provide functions such as homing, emergency stop, origin signal, alarm clearing, alarm output, in-position output, and brake signal output, meeting the needs of different customer groups.
- Equipped with overcurrent, overvoltage, undervoltage, and position protection functions.

1.3 Electrical characteristics

Driver model	DP3S-705	DP3S-808A
Input power supply voltage	20V~50VDC	20V~80VAC 20V~110VDC
Peak output current (A)	1-7	1-8.4
Matching motor (base)	42/57/60	86

Driver model		DP3S-705	DP3S-808A
Electrical spec	Station address setting	Parameter/DIP switch	
	Digital input interface	6-channel single ended input, input voltage is 12-24V	
	Digital output interface	2-channel single ended output, supporting a maximum of 50mA	
	Serial port debugging	Can be connected to the upper computer via 485 network port for debugging	
Use environment	Use occasion	Try to avoid dust, oil stains, and corrosive gases, as well as places with high humidity and strong vibrations. Combustible gases and conductive dust are prohibited	
	Ambient temperature	0℃~50℃	
	Maximum operating temperature	60℃	
	Humidify	40%~90% RH (No condensation or water droplets)	
	Vibration	5.9m/s^2 Max	
	Storage temperature	-25℃~70℃	
	Protection level	IP20	

1.4 Safety precautions

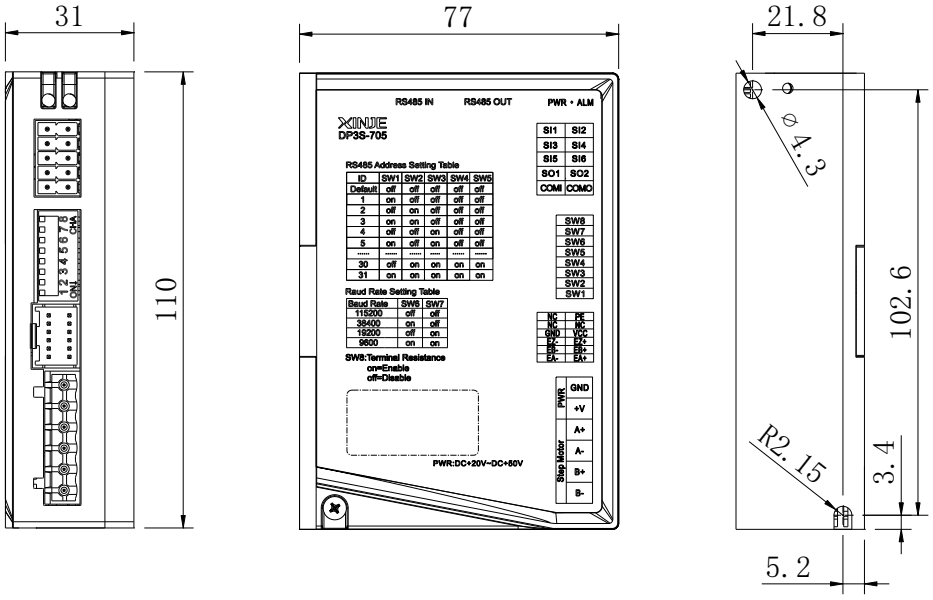
- The driver must be installed and operated by professional technicians!
- The input voltage of the driver must meet the technical requirements!
- It is strictly prohibited to plug and unplug the power terminals of the drive with electricity. When the motor stops, there is still a large current flowing through the coil, and plugging and unplugging the power terminals will generate a huge instantaneous induced electromotive force, which will burn out the drive!
- Before powering on, please ensure the correctness and firmness of the power cable, motor cable, and signal cable connections!
- Avoid electromagnetic interference!

2 Installation and wiring

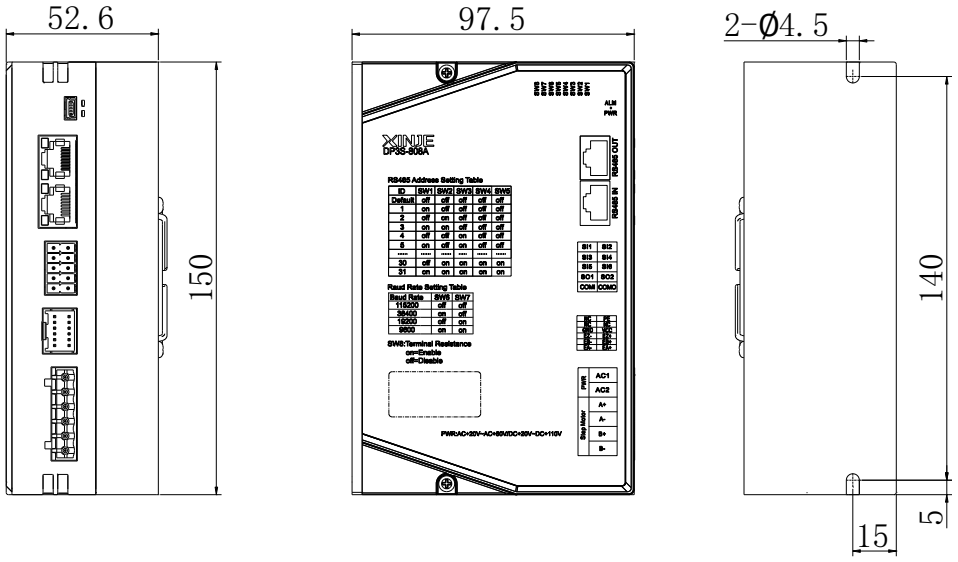
2.1 Installation

2.1.1 Dimension

■ DP3S-705 Unit: mm



■ DP3S-808A Unit: mm

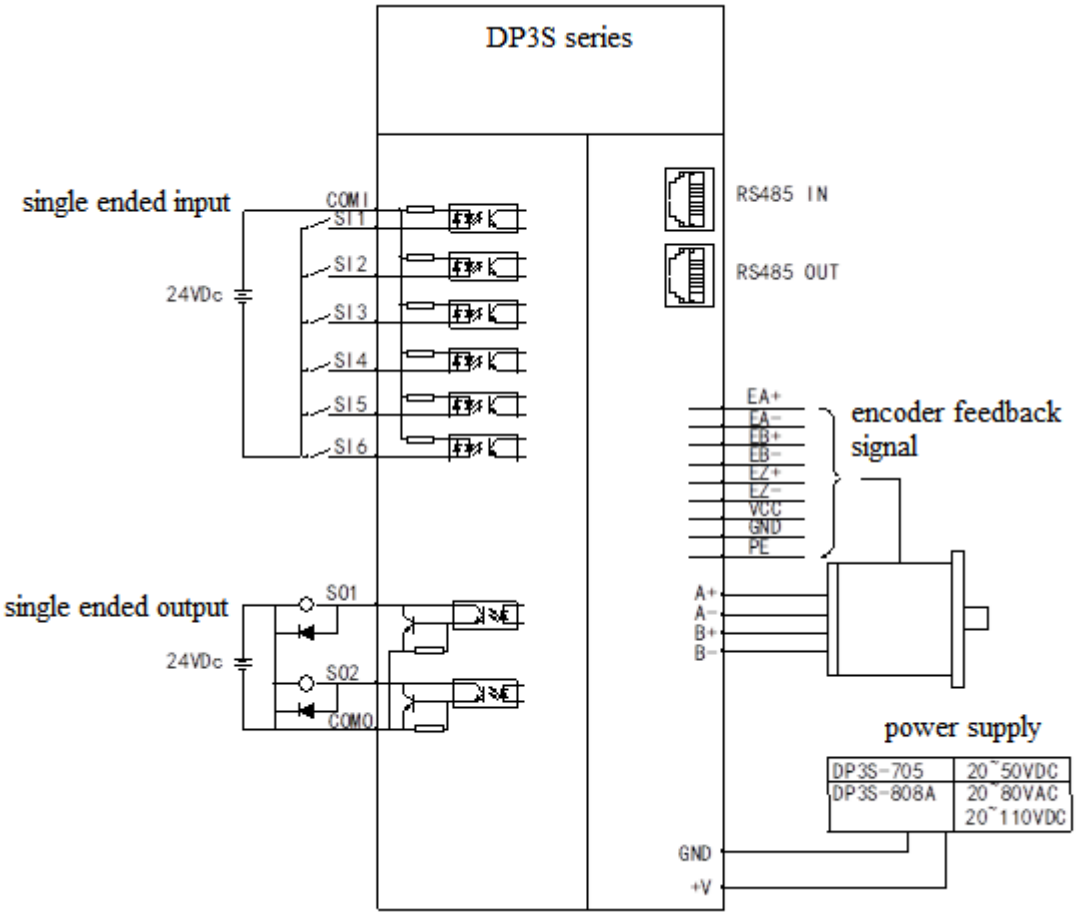


2.1.2 Installation envrionment

The reliable operating temperature of the driver is usually within 60℃, and the operating temperature of the motor is within 80℃. To ensure that the driver operates within a reliable working temperature range, it should be installed in a well ventilated and well protected electrical cabinet. If necessary, a fan should be installed near the driver to forcibly dissipate heat and avoid use in environments with dust, oil mist, corrosive gases, high humidity, and strong vibrations.

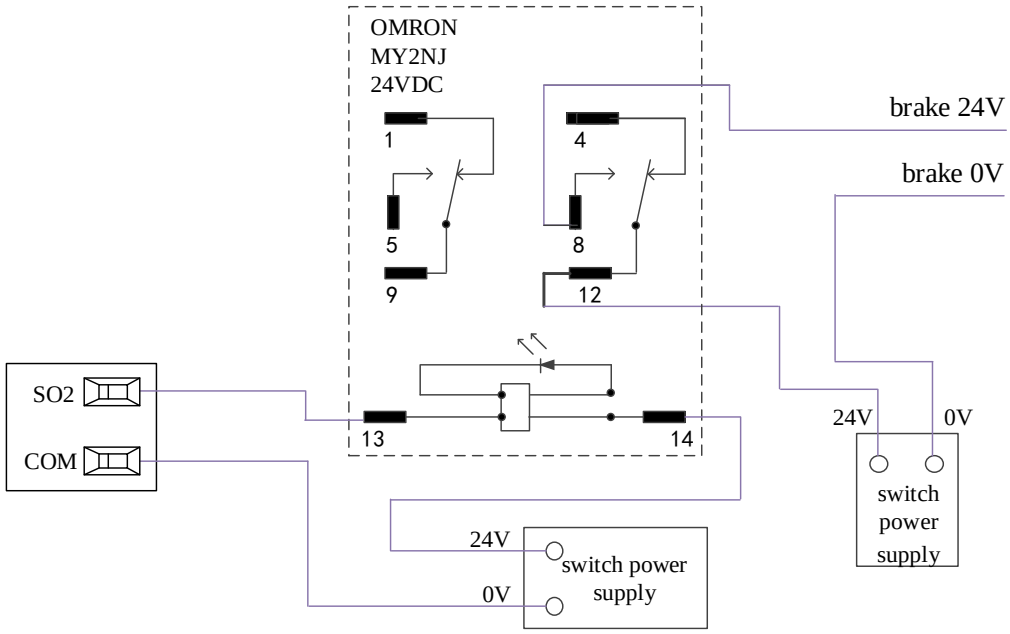
2.2 Wiring

2.2.1 Typical wiring diagram



2.2.2 Brake wiring

When DP3S stepper driver drives the brake type stepper motor, due to the output terminal of the driver itself, the function can be selected as brake output (default is SO2 output terminal), so the brake is controlled by the driver to open or close. The SO output terminal of the DP3S driver can withstand a maximum current of 50mA, so it cannot directly control the brake. An external intermediate relay can be selected to control the brake, as shown in the following figure.

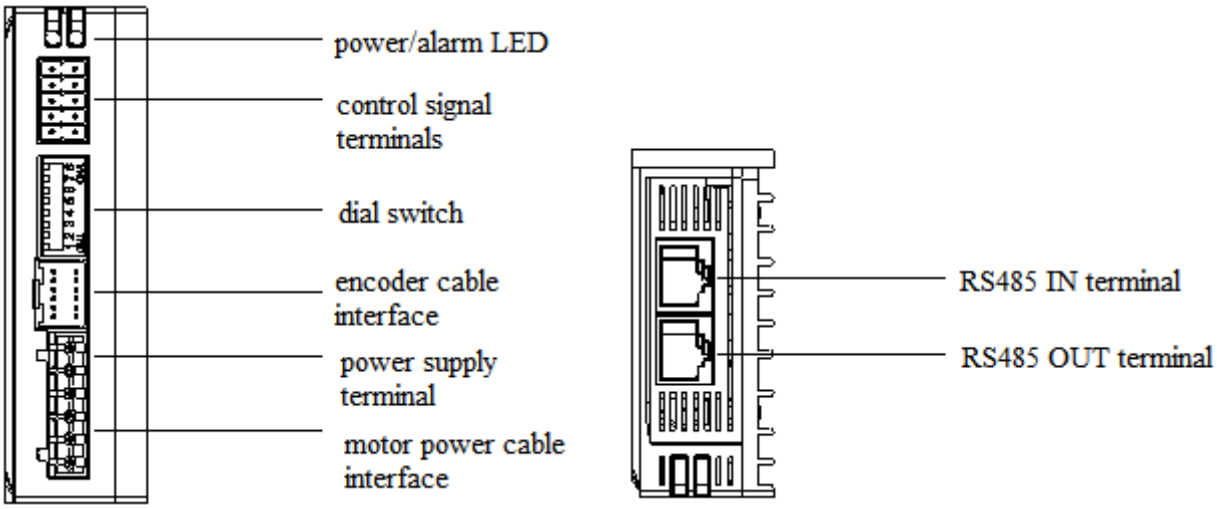


2.2.3 Wiring notice

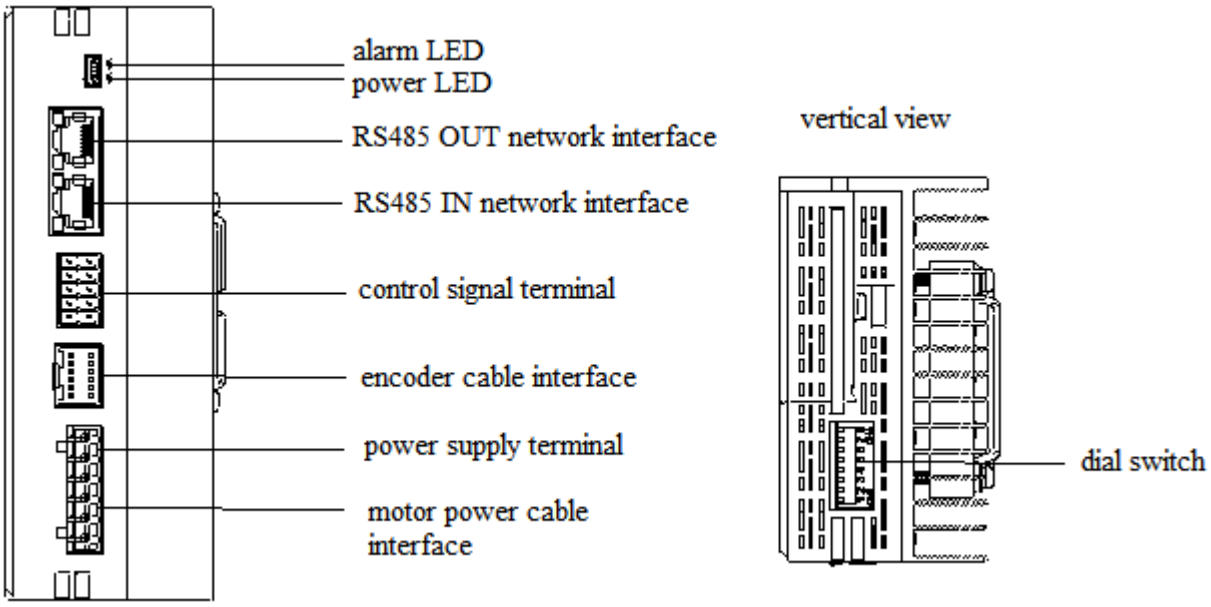
- Wiring must be done according to terminal voltage and polarity to prevent equipment damage and personnel injury. The DC driver power supply cannot be reversed;
- If one power supply supplies multiple drivers, parallel connection should be adopted at the power supply, and chain connection from one driver to another is not allowed;
- The wiring head should not be exposed outside the terminal to prevent accidental short circuit and damage to the driver.

3 Driver interface

- DP3S-705



- DP3S-808A

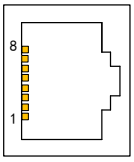


3.1 Status indicator light

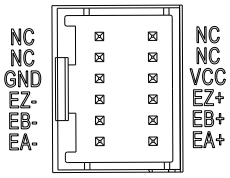
The green LED is the power indicator light, which stays on when the driver is powered on. When the driver cuts off the power, the LED goes out.

The red LED is the fault indicator light. When a fault occurs, the indicator light flashes continuously, pauses for one second, and then flashes continuously. When the fault is cleared by the user, the red LED remains off. The continuous flashing of the red LED represents different fault information. For specific fault information, please refer to chapter 7 common fault troubleshooting.

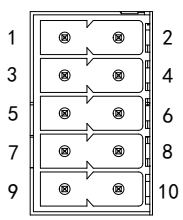
3.2 RS485 bus interface

Diagram	Pin	Function name
	4	485-A
	5	485-B
	6	485-GND
	Other	Reserved

3.3 Encoder signal input terminal

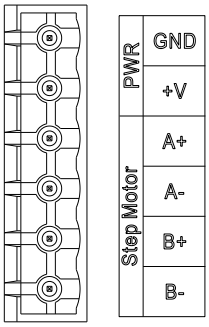
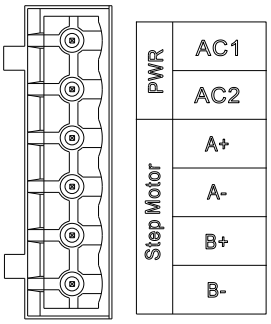
Diagram	Pin	Name	Function
	1	NC	Reserved signal, meaningless
	2	NC	
	3	NC	
	4	NC	
	5	VCC	5V power output, provided by the driver, only used for powering the encoder
	6	GND	
	7	EZ+	Encoder Z-phase signal positive terminal
	8	EZ-	Encoder Z-phase signal negative terminal
	9	EB+	Encoder B-phase signal positive terminal
	10	EB-	Encoder B-phase signal negative terminal
	11	EA+	Encoder A-phase signal positive terminal
	12	EA-	Encoder A-phase signal negative terminal

3.4 Control signal interface

Diagram	Pin	Name	I/O	Function
	1	SI1	Input	Single ended input signals SI1~SI6, 12~24V effective, maximum input frequency 10kHz, configurable function; SI1 default enable input, SI2 default alarm clear, SI3 default homing, SI4 default emergency stop, SI5 default positive limit function, SI6 default negative limit function.
	2	SI2	Input	
	3	SI3	Input	
	4	SI4	Input	
	5	SI5	Input	
	6	SI6	Input	
	7	SO1	Output	Single ended output signals SO1~SO2,

	8	SO2	Output	maximum output current 50mA, configurable function, SO1 default alarm output, SO2 default brake output
	9	COMI	Input	Input signal common terminal
	10	COMO	Output	Output signal common terminal connected to GND

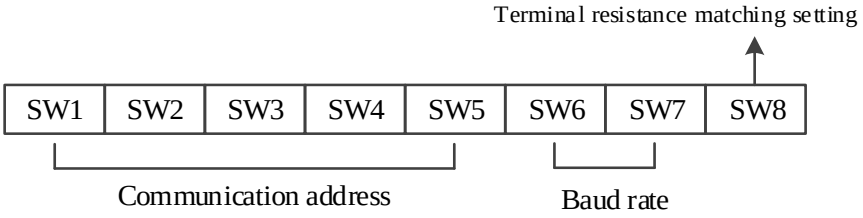
3.5 Strong electricity interface

DP3S-705	DP3S-808A
	

Interface	Function	Explanation
GND	DC power supply ground	DC power supply ground
＋V	DC power supply +	Select voltage according to requirements
A+, A-	Motor A-phase coil	Swap A+, A- can change the direction of motor operation
B+, B-	Motor B-phase coil	Swap B+ and B- can change the direction of motor operation
AC1, AC2	AC power supply	Select voltage according to requirements

- DP3S-705 voltage range is 20~50VDC: Recommended value is 24~36VDC for 57 motors, and 48V for 86 motors or high-speed applications.
- DP3S-808A voltage range is 20~80VAC: Recommended voltage is above 48V. For DC, the range is DC+20~110VDC, with a recommendation of above 48V. There is no polarity difference for AC1 and AC2 power supply connections.
- The SI input terminal should be powered with 24V, but it must not share the same power supply with the driver. Otherwise, the supply side may cause damage to signal-side components because of inductive loads.

3.6 Dial switch



3.6.1 Communication address setting

Communication address	SW1	SW2	SW3	SW4	SW5
1 (upper computer)	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF
11	ON	ON	OFF	ON	OFF
12	OFF	OFF	ON	ON	OFF
13	ON	OFF	ON	ON	OFF
14	OFF	ON	ON	ON	OFF
15	ON	ON	ON	ON	OFF
16	OFF	OFF	OFF	OFF	ON
17	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON
19	ON	ON	OFF	OFF	ON
20	OFF	OFF	ON	OFF	ON
21	ON	OFF	ON	OFF	ON
22	OFF	ON	ON	OFF	ON
23	ON	ON	ON	OFF	ON
24	OFF	OFF	OFF	ON	ON
25	ON	OFF	OFF	ON	ON
26	OFF	ON	OFF	ON	ON
27	ON	ON	OFF	ON	ON
28	OFF	OFF	ON	ON	ON
29	ON	OFF	ON	ON	ON
30	OFF	ON	ON	ON	ON

Communication address	SW1	SW2	SW3	SW4	SW5
31	ON	ON	ON	ON	ON

- Supports up to 32 axes, but the station number can be set by switching SW1~SW5 all to OFF. The station number range can then be set from 1 to 127 via the host computer or RS485 communication.
- Supports broadcast messages with station number 0, which are used for bulk modification of driver parameters. The driver does not return any message response.

3.6.2 Baud rate

Baud rate	SW6	SW7
9600	ON	ON
19200	OFF	ON
38400	ON	OFF
115200	OFF	OFF

The completion time of receiving four baud rates is shown in the following table:

Baud rate	Start receiving to send completion time	Waiting time after receiving	Time from sending to restoring receiving status	Total (ms)
9600	20.5	3.8	0.6	24.9
19200	10.76	2.2	0.38	13.34
38400	5.5	1.16	0.46	7.12
115200	2.44	0.64	0.6	3.08

When sending messages continuously on multiple axes, there will be a PLC processing waiting time between messages, which is T4 in the table below. This value varies depending on the master station and baud rate.

Start receiving to send completion time	Waiting time after receiving	Time from sending to restoring receiving status	PLC processing waiting time
T1	T2	T3	T4

3.6.3 Terminal resistance matching

Dial switch	Function	ON	OFF
SW8	Terminal resistance matching	Terminal resistance is effective	Terminal resistor is invalid

When multiple DP3S stepper drivers are communicating via RS485, the last stepper slave station needs to set the SW8 dial switch to ON, and other slave stations do not need to adjust the SW8 dial switch.

4 RS485 bus communication

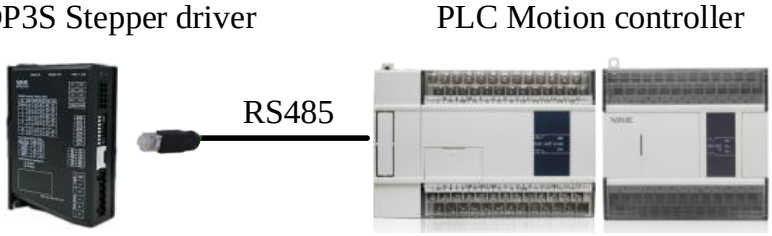
Our company provides users with a universal RS485 communication interface for industrial control. The communication protocol adopts the MODBUS standard communication protocol, and the stepper can be used as a slave to communicate with the upper computer (such as PLC controller, PC) that has the same communication interface and uses the same communication protocol. Through this communication port, the human-machine interface can also be connected to achieve remote operation of the stepper by the user.
The MODBUS communication protocol in this series supports RTU mode.

4.1 Communication specification

Item		Specification	Note
Communication specification	Electrical connection	RS485	Support RS485
	Communication speed	9600/19200/38400/115200	Set through dial switch
	Synchronous mode	Start stop synchronization	
	Communication model	Half duplex, master-slave mode	Prohibit communication between slave stations
	Character composition	Starting bit: 1 bit Data length: 8-bit Parity: Even Stop position: 1	
Protocol specification	Communication protocol	Modbus RTU	
	Communication mode	Isolation RS485	
	Equipment No.	1-31: Number of effective sub devices	Dial code/parameter setting
	Parity mode	CRC-16	
	Information length	Variable, maximum 100 bytes	

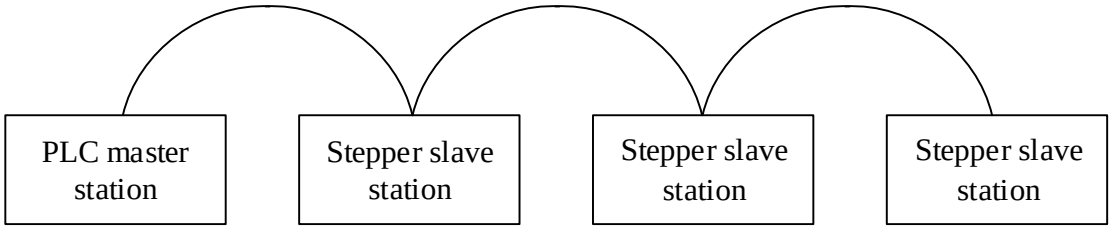
4.2 Communication wiring

4.2.1 Communication port wiring

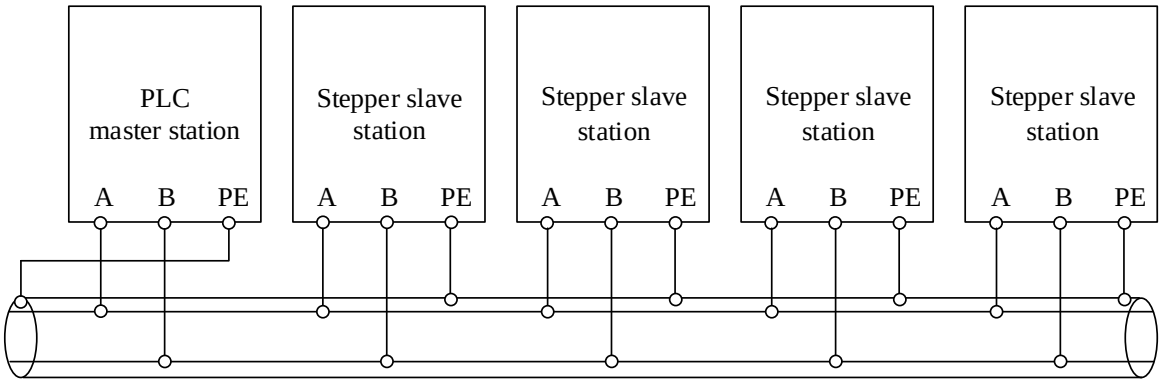


4.2.2 PLC and stepper multi-machine communication (stepper drive and motor are all well grounded)

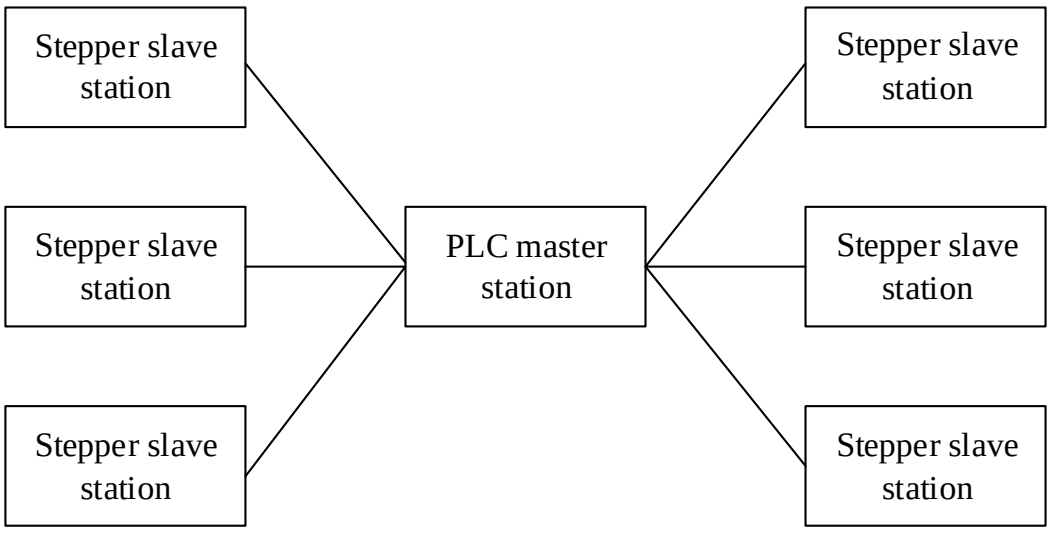
- Recommended solution: Hand in hand



- General recommendation: Branch structure



- Not recommended: star connection structure



4.3 Communication protocol

When communicating on a Modbus network, the protocol requires each controller to know its device address, recognize messages sent by address, and decide on the appropriate action. If a response is needed, the controller will generate feedback information and issue it using the Modbus protocol. On other networks, messages containing the Modbus protocol are converted into frame or packet structures usable on that network. This conversion also extends methods for resolving device addresses, routing paths, and error detection according to the specific network.

4.3.1 Character structure

- 1－8－1 format, even parity

Start bit	0	1	2	3	4	5	6	7	Even parity	Stop bit

4.3.2 Communication data structure

(1) RTU mode

START	Keep no input signal greater than or equal to 10ms
Address	Communication address: 8-bit binary address
Function	Function code: 8-bit binary address
DATA（n - 1）	Data content: N * 8-bit data, N<=8, maximum 8 bytes
……	
DATA 0	
CRC CHK Low	CRC checksum
CRC CHK High	The 16-bit CRC checksum consists of two 8-bit binary combinations
END	Maintain no incoming or outgoing signal for at least 10ms

(2) Communication address

The manual provides Modbus addresses and RS485 communication addresses corresponding to the parameter list (refer to chapter 6.1 Parameter List).

(3) Function code and data contents

Function code	Data contents
03H	Read the contents of registers, read multiple register contents, but not more than 31 at a time, and only read data from the same group at a time
06H	Write a piece of data to the register
10H	Write data to multiple registers

- Function code 03H: Read register contents

For example, read the contents of register address H0901 (P9-01).

RTU mode:

Inquire about information format		Response information format	
Address	01H	Address	01H
Function code	03H	Function code	03H
Register address	09H	Number of bytes	02H
	01H		
Number of registers	00H	Data content	02H
	01H		00H
CRC CHECK Low	D6H	CRC CHECK Low	B8H
CRC CHECK High	56H	CRC CHECK High	44H

- Function code 06H: Write data to the register

For example: write 0x0020 homing to the register address H0901 (P9-01).

RTU mode:

Inquire about information format		Response information format	
Address	01H	Address	01H
Function code	06H	Function code	06H
Register address	09H	Register address	09H
	01H		01H
Data content	00H	Data content	00H
	20H		20H
CRC CHECK Low	DAH	CRC CHECK Low	DAH
CRC CHECK High	4EH	CRC CHECK High	4EH

- Function code 10H: Write data to multiple registers

For example: write 1 and 2 to the address 0001H and 0002H.

RTU mode:

Inquire about information format		Response information format	
Address	01H	Address	01H
Function code	10H	Function code	10H
Register address	00H	Register address	00H
	01H		01H
Number of registers	00H	Number of registers	00H
	02H		02H
Write in byte numbers	04H (2*register numbers)	CRC CHECK Low	10H
Write in data 1 contents high bit	00H	CRC CHECK High	08H
Write in data 1 contents low bit	01H		
Write in data 2 contents high bit	00H		
Write in data 2 contents	02H		

Inquire about information format		Response information format	
low bit			
CRC CHECK Low	E2H		
CRC CHECK High	62H		

(4) Checksum

RTU Mode: Double-byte hexadecimal numbers.

The CRC field consists of two bytes, containing a 16-bit binary value. It is calculated by the sender and added to the message; when added, the low byte comes first, followed by the high byte, thus the high byte of the CRC is the last byte sent in the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two values differ, the received message has an error and the message frame is discarded without any response. The device continues to receive the next frame of data. For details on the CRC calculation method, refer to the MODBUS protocol specification.

5 PR function

Built-in single axis motion control function (PR): 16-segment position program can be configured, supporting functions such as positioning/homing/position limit/emergency stop/JOG.

5.1 Homing function

5.1.1 Parameter setting

<table>
<tr><th>Parameter</th><th>Address</th><th>Name</th><th>Explanation</th></tr>
<tr><td>P9-06</td><td>0x0906</td><td>Homing mode</td><td>
<table>
<tr><th>Related bit</th><th>Bit2~3</th><th>Bit1</th><th>Bit0</th></tr>
<tr><td>Explanation</td><td>Homing mode</td><td>Whether to move to the designated position after homing</td><td>Homing direction</td></tr>
<tr><td>0</td><td>Position limit homing</td><td>No</td><td>Reverse</td></tr>
<tr><td>1</td><td>Origin homing</td><td>Yes</td><td>Forward</td></tr>
<tr><td>2</td><td>Stall homing</td><td>——</td><td>——</td></tr>
<tr><td>3</td><td>Z-phase homing</td><td>——</td><td>——</td></tr>
</table>
</td></tr>
<tr><td>P9-07</td><td>0x0907</td><td>Origin position (low bit)</td><td>0 (Cannot be modified)</td></tr>
<tr><td>P9-08</td><td>0x0908</td><td>Origin position (high bit)</td><td>0 (Cannot be modified)</td></tr>
<tr><td>P9-09</td><td>0x0909</td><td>Origin offset position (low bit)</td><td>0 (Cannot be modified)</td></tr>
<tr><td>P9-10</td><td>0x090A</td><td>Origin offset position (high bit)</td><td>0 (Cannot be modified)</td></tr>
<tr><td>P9-11</td><td>0x090B</td><td>Homing high speed</td><td>Homing first segment speed, unit rpm</td></tr>
<tr><td>P9-12</td><td>0x090C</td><td>Homing low speed</td><td>Homing second segment speed, unit rpm</td></tr>
<tr><td>P9-13</td><td>0x090D</td><td>Homing acceleration time</td><td>Homing acceleration speed, unit ms (acceleration time required per 1000rpm)</td></tr>
<tr><td>P9-14</td><td>0x090E</td><td>Homing deceleration time</td><td>Homing deceleration speed, unit ms (deceleration time required per 1000rpm)</td></tr>
<tr><td>P9-15</td><td>0x090F</td><td>Homing overtravel</td><td>No alarm will be triggered if homing reached the origin point (unit: 0.1 rotation). After setting the homing overtravel, once the motor has traveled the predefined distance during the homing process, it will stop even if the homing is not complete.</td></tr>
<tr><td>P9-47</td><td>0x092F</td><td>Torque homing time</td><td>Torque maintain time of torque homing, unit: ms</td></tr>
<tr><td>P9-48</td><td>0x0930</td><td>Torque homing value</td><td>The force vaue of the torque homing mode, the stepper setting is the current percentage, unit: %</td></tr>
</table>

5.1.2 Homing mode

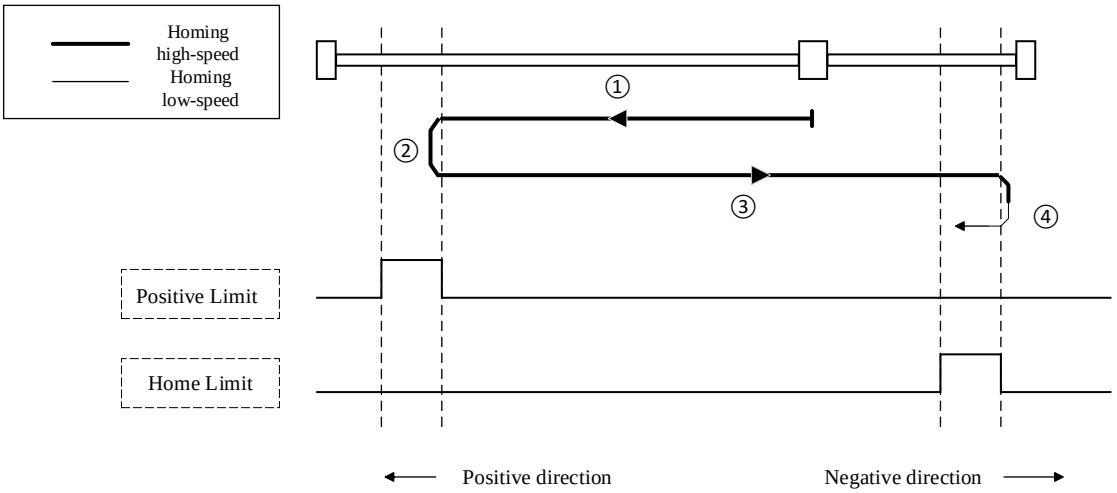
Mode 1: origin homing

When the homing method is set to origin homing, it can be combined into the following four scenarios based on the direction of the homing and the positions of the limit and origin."

(1) Origin + positive limit homing

When the initial position is between the positive limit and the origin, and the homing mode begins, the initial direction moves towards the positive limit:

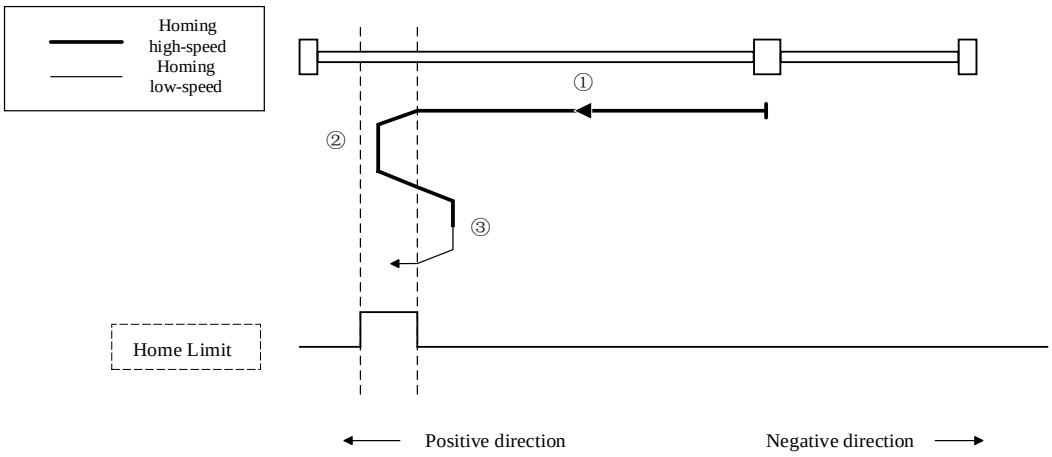
1. The speed accelerates from 0 to the homing high-speed and runs at a constant speed until it reaches the positive limit.
2. When the rising edge of the positive limit is detected, the speed decelerates from the homing high-speed to 0, then moves towards the negative limit direction, accelerating from 0 to the homing high-speed.
3. It runs at a constant speed until it reaches the origin.
4. When the falling edge of the origin signal is detected, the speed decelerates from the homing high-speed to 0, moving towards the positive limit direction, accelerating from 0 to the homing low-speed, and runs at a constant speed until the rising edge of the origin signal is detected, then the speed decelerates to 0 and stops.



(2) Positive direction origin homing

When the initial position is between the negative limit and the origin, and the homing mode begins, the initial direction moves towards the positive limit:

1. The speed accelerates from 0 to the homing high-speed and runs at a constant speed until it reaches the origin signal.
2. When the rising edge of the origin signal is detected, the speed decelerates from the homing high-speed to 0, then moves towards the negative limit direction, accelerating from 0 to the homing high-speed.
3. When the falling edge of the origin signal is detected, the speed decelerates from the homing high-speed to 0, moves towards the positive limit direction, accelerates from 0 to the homing low-speed, and runs at a constant speed until the rising edge of the origin signal is detected, then the speed decelerates to 0 and stops.



(3) Origin + negative limit homing

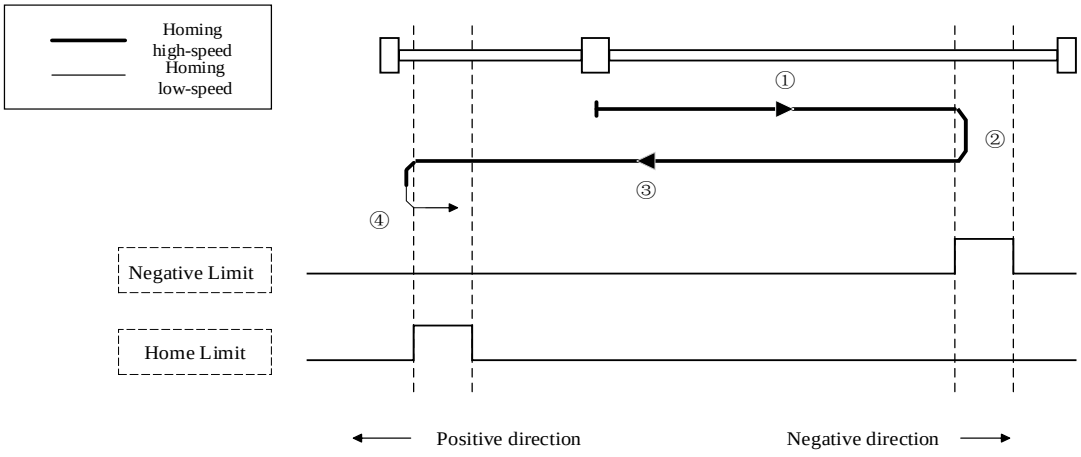
When the initial position is between the negative limit and the origin, and the homing mode begins, the initial direction moves towards the negative limit:

1. The speed accelerates from 0 to the homing high-speed and runs at a constant speed until it reaches the negative limit.

2. When the rising edge of the negative limit is detected, the speed decelerates from the homing high-speed to 0, then moves towards the positive limit direction, accelerating from 0 to the homing high-speed.

3. It runs at a constant speed until it reaches the origin.

4. When the falling edge of the origin signal is detected, the speed decelerates from the homing high-speed to 0, moves towards the negative limit direction, accelerates from 0 to the homing low-speed, and runs at a constant speed until the rising edge of the origin signal is detected, then the speed decelerates to 0 and stops.



(4) Negative direction origin homing

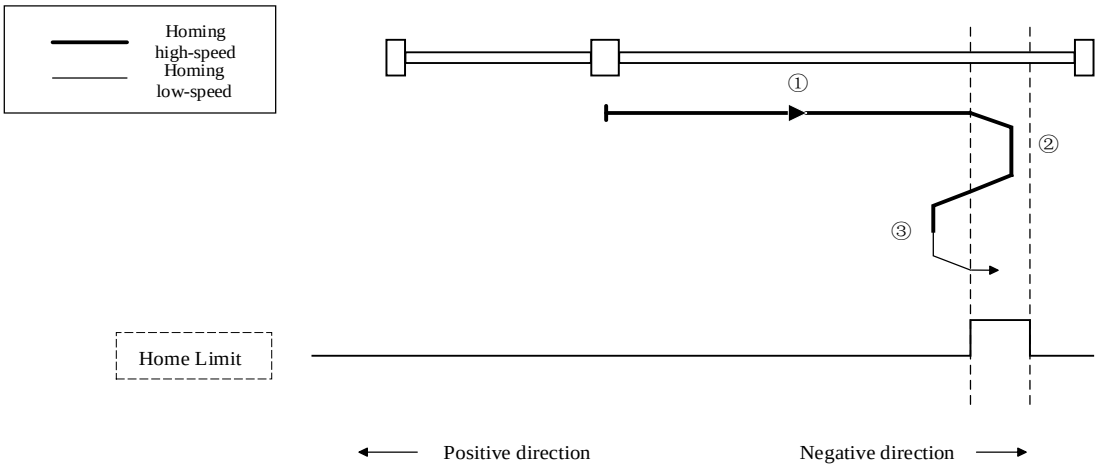
When the initial position is between the positive limit and the origin, and the homing mode begins, the initial direction moves towards the negative limit:

1. The speed accelerates from 0 to the homing high-speed and runs at a constant speed until it reaches the origin signal.

2. When the rising edge of the origin signal is detected, the speed decelerates from the homing high-speed to 0, then moves towards the positive limit direction, accelerating from 0 to the homing high-speed.

3. When the falling edge of the origin signal is detected, the speed decelerates from the homing high-speed to 0,

moves towards the negative limit direction, accelerates from 0 to the homing low-speed, and runs at a constant speed until the rising edge of the origin signal is detected, then the speed decelerates to 0 and stops.

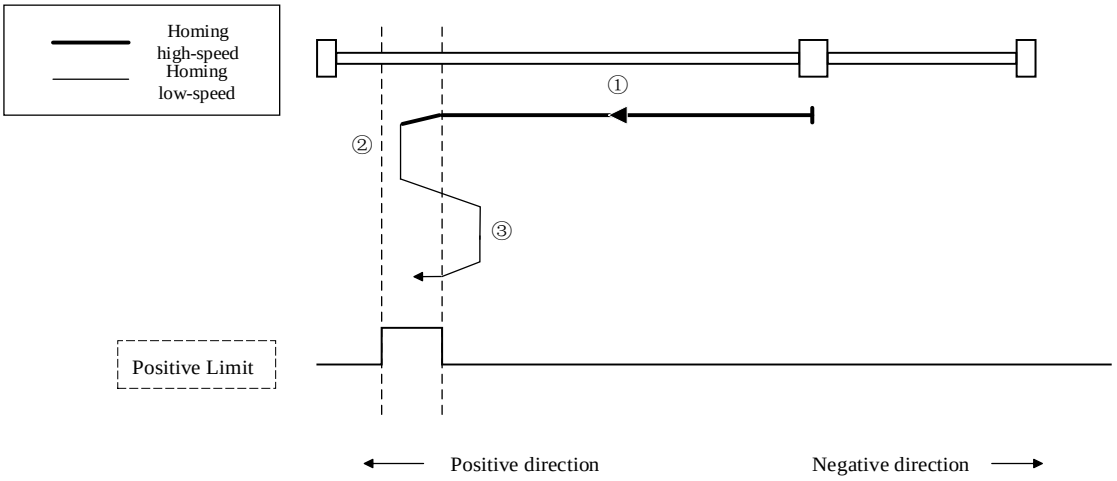


Mode 2: position limit homing

(1) Positive limit homing

The initial homing is between the positive limit and negative limit. The homing process begins, and the initial direction is towards the positive limit direction.

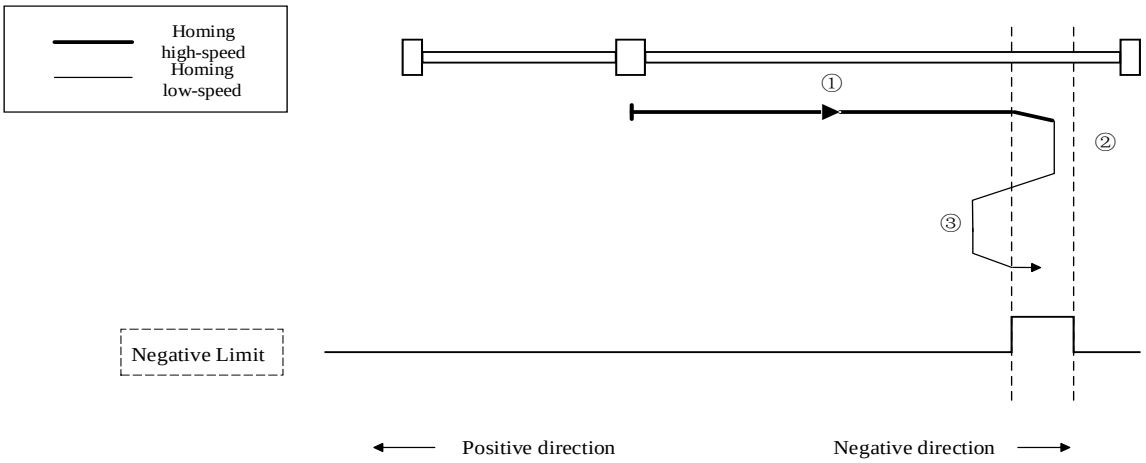
1. The speed accelerates from 0 to the high-speed homing velocity, moving at constant speed until the positive limit signal is detected.
2. Upon detecting the rising edge of the positive limit signal, the speed decelerates from the high-speed homing velocity to 0, then moves in the direction of the negative limit, accelerating from 0 to the low-speed homing velocity.
3. When the falling edge of the positive limit signal is detected, the speed decelerates from the low-speed homing velocity to 0, then moves in the direction of the positive limit, accelerating from 0 to the low-speed homing velocity, and continues at constant speed until the rising edge of the origin signal is detected, then the speed decelerates to 0 and stops.



(2) Negative limit homing

The initial homing is between the positive limit and the negative limit. The homing process begins, and the initial direction is towards the negative limit.

1. The speed accelerates from 0 to the high-speed homing velocity, moving at constant speed until the negative limit signal is detected.
2. Upon detecting the rising edge of the negative limit signal, the speed decelerates from the high-speed homing velocity to 0, then moves in the direction of the positive limit, accelerating from 0 to the low-speed homing velocity.
3. When the falling edge of the negative limit signal is detected, the speed decelerates from the low-speed homing velocity to 0, then moves in the direction of the negative limit, accelerating from 0 to the low-speed homing velocity, and continues at constant speed until the rising edge of the origin signal is detected, then the speed decelerates to 0 and stops.



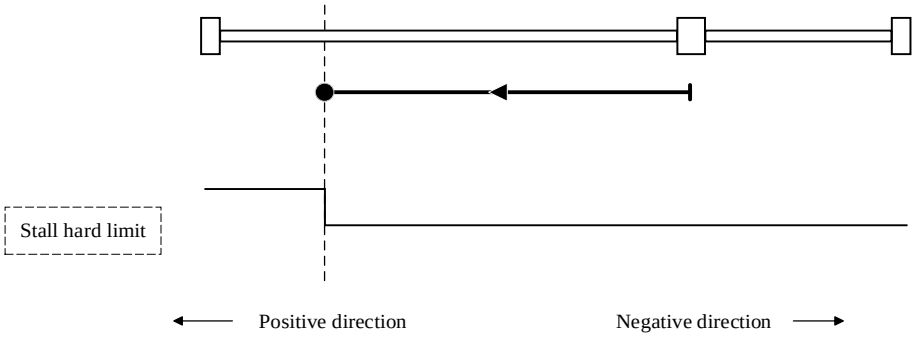
Mode 3: Homing manually

Through the register address 0x0901 (P9-01 Trigger Register), write 0x021. After triggering, the current value of the motor is reset to zero, taking the current point as the origin. This can be triggered during operation.

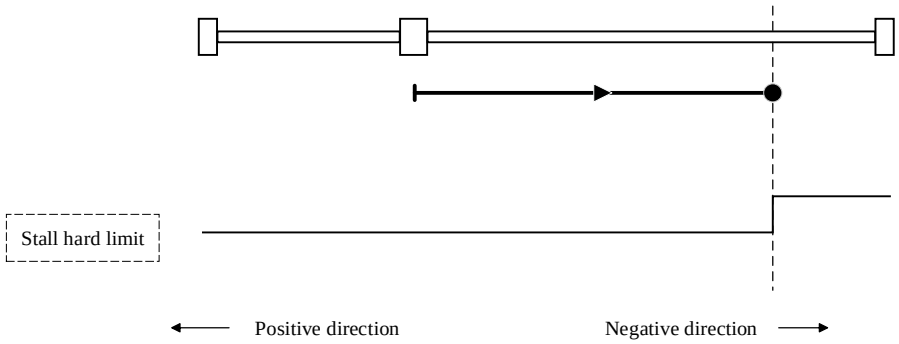
Mode 4: Stall homing (torque homing)

Stall homing (referred to as torque homing in the host computer debugging software) occurs when the motor stalls, and after a fixed time, it is determined that the torque has reached the desired point. The current point is then set as the origin, and a homing completion signal is output. You can select the torque homing mode in the host computer debugging software or operate it via the register address.

(1) Stalling homing in positive limit direction

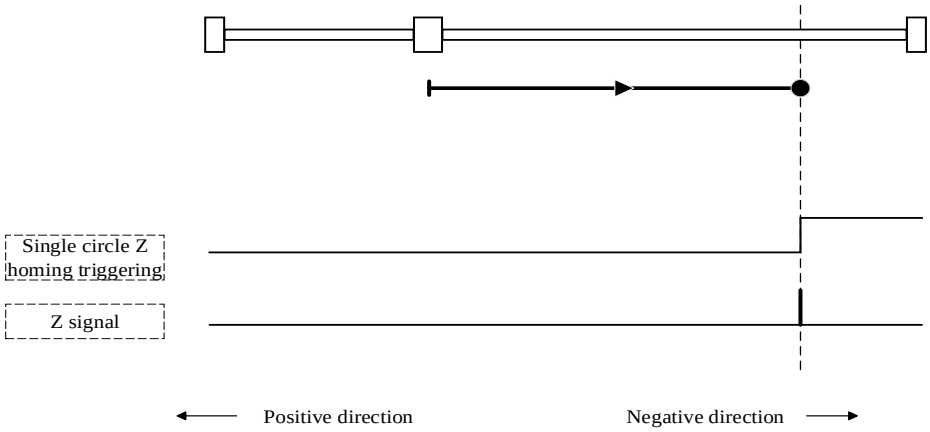


(2) Stalling homing in negative limit direction



Mode 5: Z-phase homing

During motor movement, the first Z-phase signal encountered after triggering the Z-phase homing will be used as the origin signal.



5.1.3 Trigger mode

Mode 1: Automatic homing on power-up:

By writing 1 to bit 2 of register address 0x0900 (P9-00), the motor will automatically seek the origin after the driver is powered on and enabled.

Mode 2: Triggering homing

(1) Trigger HOME function of IO port

- **Edge triggering/level triggering**

Edge Triggering: When the path requires an IO port trigger (CTRG) signal for activation, it can be configured for rising edge triggering or dual edge triggering (falling edge triggering is not available).

Level Triggering: Through RS485, it can be configured for level triggering. When the IO port trigger signal is maintained, the path is initiated. If the signal level fails midway, the path stops, and upon the next trigger, the path restarts.

<table>
<tr><th>Definition</th><th>Address</th><th>Function</th><th>Note</th></tr>
<tr><td>PR control setting</td><td>P9-00 (0x0900)</td><td>
<table>
<tr><th>Related bit</th><th>Bit3</th><th>Bit0</th></tr>
<tr><td>Explanation</td><td>Level trigger</td><td>Edge trigger</td></tr>
<tr><td>Set to 0</td><td>Invalid</td><td>Rising edge</td></tr>
<tr><td>Set to 1</td><td>Valid</td><td>Dual edge</td></tr>
</table>
</td><td>When the level trigger is valid, both the Bit0 trigger method and the 485 communication trigger will be invalid</td></tr>
</table>

- **IO combination triggering**

Configuration is done through parameter P9-18 for the combined trigger mode. When using IO for combined triggering, there is no need to utilize the trigger signal (CTRG) on the IO port, which saves IO ports and simplifies control. Different bit positions correspond to different functions; setting a bit to 1 enables the function, whereas setting it to 0 disables the function.

Definition	Address	Function	Note
IO combination triggering mode	P9-18 (0x0912)	0: IO combination trigger (default) 2: IO combination trigger, it is valid when homing is ok 4: IO combination trigger, no need to homing (recommended)	-

(2) PR path triggering

Write 3 in Bit 0-3 of the address 0x0A00 + n*8, homing.

Definition	Address	Function	Note
Motion mode path	P10-00 + n*8 (0x0A00 + n*8)	Bit 0-3=3: homing	-

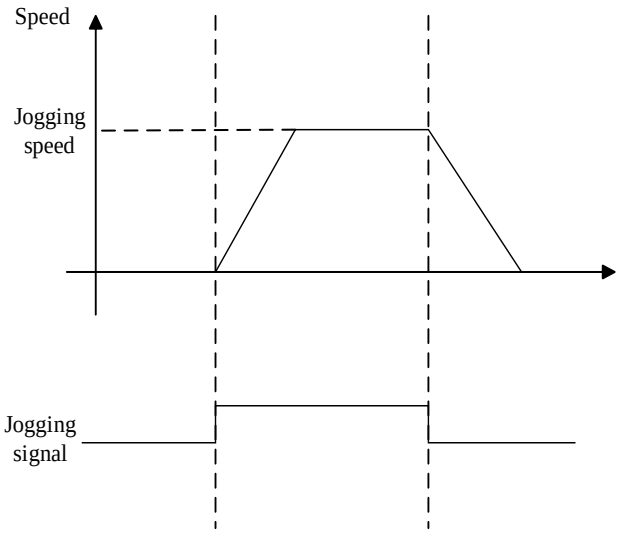
(3) RS485 communication triggering

Write 0x020 in the address 0x0901 (P9-01), homing.
Write 0x021 in the address 0x0901 (P9-01), set to zero at the current position by manual.

Definition	Address	Function	Note
Triggering register	P9-01 (0x0901)	0x020: homing 0x021: set to zero at the current position by manual	-

5.2 JOG function

Forward and reverse jogging can be achieved through IO or RS485 communication, and this can be used for debugging. This functionality allows for equipment alignment, debugging, and motor forward and reverse speed operations. It is commonly used for speed operations. Jogging is divided into two types: RS485 communication-triggered jogging and IO-triggered jogging, with different parameter addresses corresponding to each type.
The jogging timing diagram is as depicted in the image below. When the rising edge of the jogging signal is detected, the speed accelerates from 0 to the jogging speed. When the falling edge of the jogging signal is detected, the speed decreases from the jogging speed to 0.



Mode 1: RS485 communication triggering

Definition	Address	Function	Note
Control command	0x2100	0: disable 2: forward operation 3: reverse operation 5: enable	Write
JOG speed	0x0916 (P9-22) 0x0917 (P9-23)	Unit rpm	Write
JOG acceleration time	0x0918 (P9-24)	Unit ms (acceleration time required per 1000rpm)	Write
JOG deceleration time	0x0919 (P9-25)	Unit ms (deceleration time required per 1000rpm)	Write

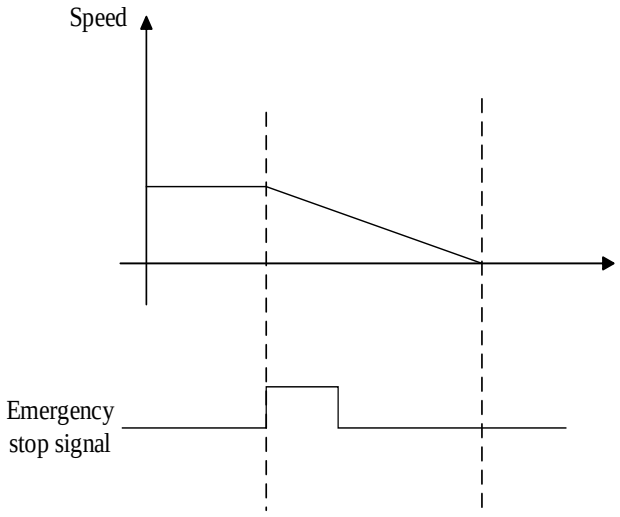
Mode 2: IO triggering

After assigning the forward JOG and reverse JOG functions to the IO port, applying a signal level to the IO port will trigger the JOG function.

Definition	Address	Function
IO port SI1~SI6	P2-00~P2-05	4: forward jogging 5: reverse jogging

5.3 Limit and emergency stop function

For hard limit and emergency stop functions, after assigning the positive limit, negative limit, and emergency stop functions to the IO port, applying a signal level to the IO port will trigger the limit and emergency stop functions.
Soft limits can be set for forward and reverse positions through parameters P9-02 to P9-05.
When the rising edge of the emergency stop signal is detected, the speed decreases to 0.



Emergency stop sequence diagram

Definition	Parameter	Function
IO port SI1~SI6	P2-00~P2-05	3: emergency stop 6: positive limit 7: negative limit
Positive limit (low bit)	P9-02	The lower bits of the software limit forward position are ineffective during homing
Positive limit (high bit)	P9-03	The high bits of the software limit forward position are ineffective during homing
Negative limit (low bit)	P9-04	The lower bits of the software limit reverse position are ineffective during homing
Negative limit (high bit)	P9-05	The high bits of the software limit reverse position are ineffective during homing

5.4 Positioning function

5.4.1 Path configuration

The PR path of the DP3S series driver is created by combining address 0, address 1, address 2, and address 3 to form a path number. By operating this path number, the PR action can be completed.

Each IO port of the driver can be configured as any of address 0 to address 3. The final path number is realized through the combination of these addresses.

Not every IO port needs to be fully configured with addresses 0 to 3, unless you need to use all 16 paths. Otherwise, using an IO port for an address x that isn't needed is just wasting the IO port.

If only one path is used, such as path 0, there is no need to configure address x for the IO port, because under path 0, all addresses x are off.

IO/motion path	SI1 (address 0)	SI2 (address 1)	SI3 (address 2)	SI4 (address 3)
Path 0	0	0	0	0
Path 1	1	0	0	0
Path 2	0	1	0	0
Path 3	1	1	0	0
Path 4	0	0	1	0
Path 5	1	0	1	0

IO/motion path	SI1 (address 0)	SI2 (address 1)	SI3 (address 2)	SI4 (address 3)
Path 6	0	1	1	0
Path 7	1	1	1	0
Path 8	0	0	0	1
Path 9	1	0	0	1
Path 10	0	1	0	1
Path 11	1	1	0	1
Path 12	0	0	1	1
Path 13	1	0	1	1
Path 14	0	1	1	1
Path 15	1	1	1	1

5.4.2 Fixed triggering mode

The fixed trigger method refers to configuring up to 16 homing and path segments first, and then using 0x0901 (P9-01 trigger register) to replace CTRG and HOME for initiating the path operation. This method is suitable for systems with fixed actions and simple operations.

The steps are as follows:

1. First, configure the homing and path that need to be executed. This can be done by temporarily sending parameter configurations upon powering on, or by configuring them using the host computer and then saving them.
2. Enable the driver.
3. Select and start various actions by writing the appropriate commands to 0x0901 (P9-01).

Definition	Address	Function
Triggering register	P9-01 (0x0901)	0x01P: P is path number 0~F, P segment positioning 0x020: homing 0x021: set to zero at the current position by manual 0x040: emergency stop

5.4.3 Immediate triggering mode

The fixed trigger method is limited by 16 position segments, whereas the immediate trigger method is much more flexible. The immediate trigger writes the current path each time and simultaneously triggers the execution of that path. Using a single data frame, it can perform actions such as positioning, adjusting speed, and homing.

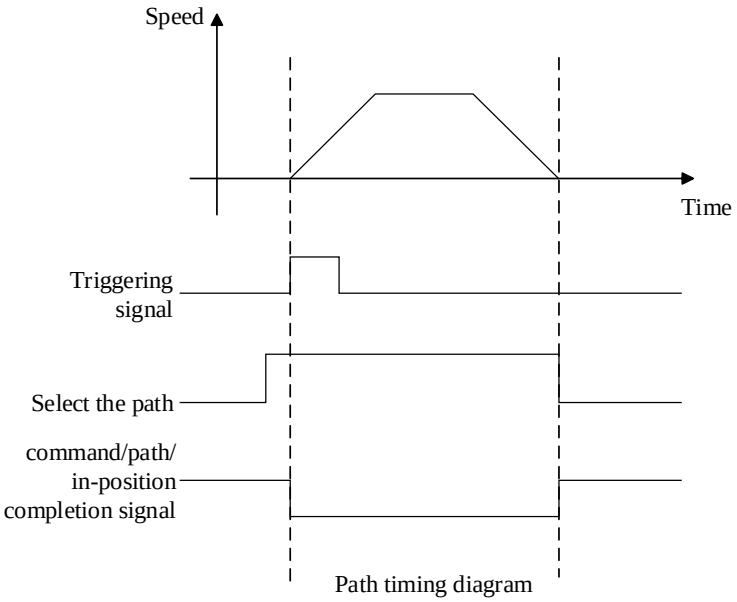
Steps for operation:

1. First, configure the homing and paths that need to be executed. This can be done by temporarily sending parameter configurations upon powering on, or by configuring them using the host computer and then saving them (homing must be configured).
2. Enable the driver.
3. Set the path value using P9-01 (0x0901) to operate the fixed path.

5.4.4 Path triggering mode

Paths can operate in a single segment or continuously. There are three types of positioning paths: position positioning type, speed operation type, and homing type. There are a total of 16 PR paths, with each path individually setting movement types, positioning methods, speeds, acceleration/deceleration rates, and pause times. Specific path editing can be done using debugging software or by setting parameters.

After selecting the desired path, when the rising edge of the trigger signal is detected, the corresponding path begins execution. At this point, there is no output for the in-position command/path/completion signal. Once this segment of the path is completed, the in-position command/path/ completion signal outputs a high level.



Path timing diagram

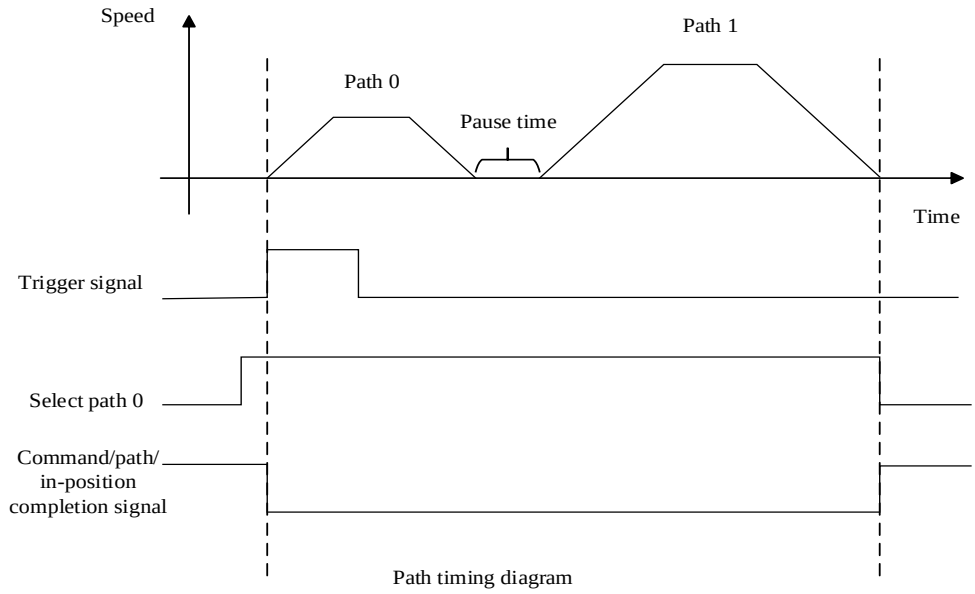
Mode 1: Multi-segment jump operation

It can achieve multi-segment path continuous and cyclic jump functionality. When a path is triggered to run, it decelerates to 0 after the command is completed, pauses for the set time, then accelerates to jump to the corresponding path, and so on.

Example: Path 0 (positioning) jumps to Path 1 (speed operation).

First, select Path 0. When the rising edge of the trigger signal is detected, Path 0 begins its action. After Path 0 is completed, and after the pause time, it jumps to Path 1. When Path 1 is completed, the in-position command/path /completion signal outputs a high level.

When Path 0 is completed, there is no in-position command/path/ completion signal during the pause time.

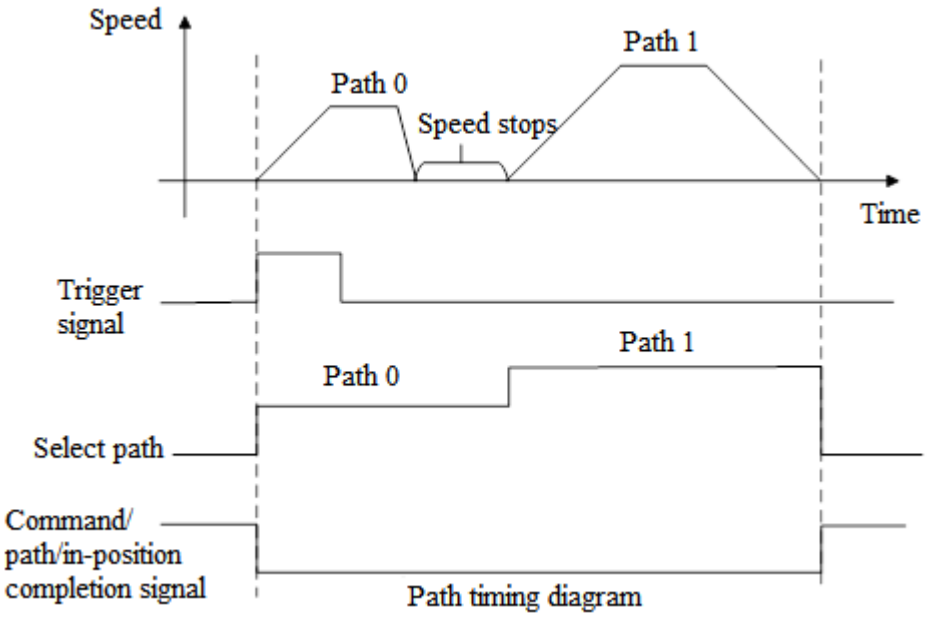


Path timing diagram

<table>
<tr><th>Parameter</th><th>Meaning</th><th>Note</th></tr>
<tr><td>P10-00</td><td>Motion mode path 0</td><td>
<table>
<tr><td>Related bit</td><td>Bit14</td><td>Bit8-11</td><td>Bit6</td><td>Bit0~3</td></tr>
<tr><td>Explanation</td><td>Jump</td><td>Jump to path 1</td><td>Absolute/ relative</td><td>Positioning</td></tr>
<tr><td>Set value</td><td>1</td><td>0001</td><td>0/1</td><td>001</td></tr>
</table>
</td></tr>
<tr><td>P10-01</td><td>Position (low bit)</td><td rowspan="2">Bit 31
0: positive direction
1: negative direction</td></tr>
<tr><td>P10-02</td><td>Position (high bit)</td></tr>
<tr><td>P10-03</td><td>Operation speed</td><td>Unit rpm</td></tr>
<tr><td>P10-04</td><td>Acceleration time</td><td>Unit ms (acceleration time required per 1000rpm)</td></tr>
<tr><td>P10-05</td><td>Deceleration time</td><td>Unit ms (deceleration time required per 1000rpm)</td></tr>
<tr><td>P10-06</td><td>Pause time</td><td>The pause time after the instruction stops</td></tr>
<tr><td>P10-08</td><td>Motion mode path 1</td><td>
<table>
<tr><td>Related bit</td><td>Bit7</td><td>Bit0~3</td></tr>
<tr><td>Explanation</td><td>Reverse /forward</td><td>Speed operation</td></tr>
<tr><td>Set value</td><td>0/1</td><td>010</td></tr>
</table>
</td></tr>
<tr><td>P10-11</td><td>Operation speed</td><td>Unit rpm</td></tr>
<tr><td>P10-12</td><td>Acceleration time</td><td>Unit ms (acceleration time required per 1000rpm)</td></tr>
<tr><td>P10-13</td><td>Deceleration time</td><td>Unit ms (deceleration time required per 1000rpm)</td></tr>
</table>

Mode 2: Continuous operation, continuous paths do not overlap

Example: Path 0 (positioning) and Path 1 (speed operation) run continuously;

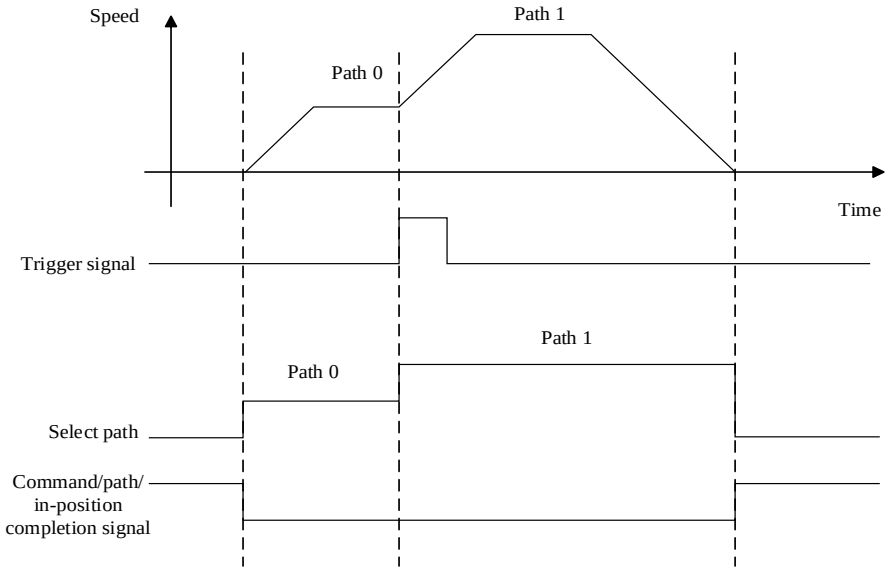


<table>
<tr><th>Parameter</th><th>Meaning</th><th>Note</th></tr>
<tr><td>P10-00</td><td>Motion mode path 0</td><td>
<table>
<tr><td>Related bit</td><td>Bit14</td><td>Bit8-11</td><td>Bit6</td><td>Bit5</td><td>Bit0~3</td></tr>
<tr><td>Explanation</td><td>Jump</td><td>Jump to path 1</td><td>Absolute/ relative</td><td>No overlap</td><td>Positioning</td></tr>
<tr><td>Set value</td><td>1</td><td>0001</td><td>0/1</td><td>0</td><td>001</td></tr>
</table>
</td></tr>
<tr><td>P10-01</td><td>Position (low bit)</td><td rowspan="2">Bit 31
0: positive direction
1: negative direction</td></tr>
<tr><td>P10-02</td><td>Position (high bit)</td></tr>
<tr><td>P10-03</td><td>Operation speed</td><td>Unit rpm</td></tr>
<tr><td>P10-04</td><td>Acceleration time</td><td>Unit ms (acceleration time required per 1000rpm)</td></tr>
<tr><td>P10-05</td><td>Deceleration time</td><td>Unit ms (deceleration time required per 1000rpm)</td></tr>
<tr><td>P10-06</td><td>Pause time</td><td>The pause time for continuous operation is 0</td></tr>
<tr><td>P10-08</td><td>Motion mode path 1</td><td>
<table>
<tr><td>Related bit</td><td>Bit7</td><td>Bit5</td><td>Bit0~3</td></tr>
<tr><td>Explanation</td><td>Reverse/forward</td><td>No overlap</td><td>Speed operation</td></tr>
<tr><td>Set value</td><td>0/1</td><td>0</td><td>010</td></tr>
</table>
</td></tr>
<tr><td>P10-11</td><td>Operation speed</td><td>Unit rpm</td></tr>
<tr><td>P10-12</td><td>Acceleration time</td><td>Unit ms (acceleration time required per 1000rpm)</td></tr>
<tr><td>P10-13</td><td>Deceleration time</td><td>Unit ms (deceleration time required per 1000rpm)</td></tr>
</table>

Mode 3: Interrupt function

The interrupt function can be understood as a priority level for a path. A path with an effective interrupt can interrupt and abandon the current path when triggered, running the designated path directly, similar to a function's interrupt priority.

Example: Configure two paths. When Path 0 is not yet completed, the interrupt function can be used to jump to the speed and path of Path 1 while maintaining continuous speed, even if Path 0 is still in progress.



Path timing diagram

<table>
<tr><th>Parameter</th><th>Meaning</th><th>Note</th></tr>
<tr><td>P10-00</td><td>Motion mode path 0</td><td>
<table>
<tr><td>Related bit</td><td>Bit14</td><td>Bit8-11</td><td>Bit6</td><td>Bit4</td><td>Bit0~3</td></tr>
<tr><td>Explanation</td><td>Jump</td><td>Jump to path 1</td><td>Absolute/ relative</td><td>Can be interrupted</td><td>Positioning</td></tr>
<tr><td>Set value</td><td>1</td><td>0001</td><td>0/1</td><td>0</td><td>001</td></tr>
</table>
</td></tr>
<tr><td>P10-01</td><td>Position (low bit)</td><td rowspan="2">Bit 31
0: positive direction
1: negative direction</td></tr>
<tr><td>P10-02</td><td>Position (high bit)</td></tr>
<tr><td>P10-03</td><td>Operation speed</td><td>Unit rpm</td></tr>
<tr><td>P10-04</td><td>Acceleration time</td><td>Unit ms (acceleration time required per 1000rpm)</td></tr>
<tr><td>P10-05</td><td>Deceleration time</td><td>Unit ms (deceleration time required per 1000rpm)</td></tr>
<tr><td>P10-06</td><td>Pause time</td><td>The pause time after the instruction stops</td></tr>
<tr><td>P10-08</td><td>Motion mode path 1</td><td>
<table>
<tr><td>Related bit</td><td>Bit7</td><td>Bit4</td><td>Bit0~3</td></tr>
<tr><td>Explanation</td><td>Reverse/forward</td><td>Can be interrupted</td><td>Speed operation</td></tr>
<tr><td>Set value</td><td>0/1</td><td>0</td><td>010</td></tr>
</table>
</td></tr>
<tr><td>P10-11</td><td>Operation speed</td><td>Unit rpm</td></tr>
<tr><td>P10-12</td><td>Acceleration</td><td>Unit ms (acceleration time required per 1000rpm)</td></tr>
</table>

Parameter	Meaning	Note
	time	
P10-13	Deceleration time	Unit ms (deceleration time required per 1000rpm)

5.4.5 S code output setting

The S code (state status code) refers to the indication code that indicates the status of the currently executing PR path. It is used to show the status of the current path, whether it is running or the path is completed.

During normal path program execution, regardless of which segment of the path is completed, the driver will uniformly output the running status, making it difficult to identify the specific segment's status. The S code can help pinpoint the specific path, allowing you to identify the running status of a particular segment by configuring an S code for that segment. Subsequently, you can read the status from the output port or the value of P9-20 (0x0914).

Each PR path can be assigned an S code, meaning each path has a dedicated S code register. The specific value of the S code can be customized by the user according to the format in the table below.

S code	High 8-bit		Low 8-bit	
Bit	Bit15	Bit8, Bit9	Bit7	Bit0, Bit1
Explanation	Whether the S code is valid upon completion: 0: invalid 1: valid (recommended)	The S code upon completion	Whether starting the S code is valid: 0: invalid 1: valid (recommended)	S code at startup

The DP3S series driver has only two output ports, and the S code can use only 2 bits, with each bit corresponding to an output. Therefore, there are only 4 possible output combinations (00, 01, 10, 11), which can be set according to the customer's requirements.

If hardware output is needed when using the S code, the output port must be configured to the S code output function. After determining the binary settings for the S code bit0-15 list, the values should be converted into hexadecimal values. Then, in the PR path table, fill in the S code settings value on the far right side of each path segment to use them.

Example: Here we use path 1-2 to illustrate:

- The output port is configured with S-code output function, and the polarity is set to normally open;
- 1 indicates that the output optocoupler is conducting;
- 0 indicates that the output optocoupler is turned off;
- 01 indicates that output port 1 is conductive and output port 2 is non-conductive;
- P9-20: Current output value of S code, register address: 0x0914.

Path number	Completion function code Bit8, Bit9	Startup function code Bit0, Bit1	S code setting value	Note	P9-20 Setting value
Path 1	01	00	Binary: 1000 0001 1000 0000 Hex: 0x8180	At startup: Both output ports have no voltage level When completed: Output port 1 has a voltage level	1
Path 2	11	10	Binary: 1000 0011 1000 0010 Hex: 0x8382	At startup: output port 2 has a voltage level At completion: Output ports 1 and 2 have voltage levels	3

6 Parameter list and setting

6.1 Parameter list

Group P0: basic function parameters

Parameter	Address	Meaning	Range	Default	Note
P0-01	0x0001	Subdivision	200~51200	10000	Cannot be modified
P0-02	0x0002	Filtering time	0~48	1	Repowering on takes effect; 0: Disable filtering function
P0-03	0x0003	Closed loop current percentage	1~100	50	Closed loop operating current=percentage of closed-loop current x peak current
P0-04	0x0004	Mode selection	0~3	3	3: PR motion mode
P0-05	0x0005	Open loop current percentage	1~100	50	Open loop operating current=percentage of open loop current * peak current
P0-06	0x0006	Open/close loop mode	0~1	1	0: Open loop mode 1: Closed loop mode
P0-09	0x0009	Closed loop holding current percentage	1~100	50	Closed loop holding current=percentage of closed loop holding current * maximum current in closed loop mode
P0-15	0x000F	Rigid grade	0~7	3	The larger the value, the stronger the rigidity
P0-16	0x0010	Blockage detection	0~1	0	0: Enable blockage detection 1: Disable blockage detection

Group P1: gain control parameters

Parameter	Address	Meaning	Range	Default	Note
P1-00	0x0100	Current loop power on self-tuning	0~1	1	0: Set parameters 1: Self-tuning parameters
P1-01	0x0101	Current Kp	1~65535	1500	
P1-02	0x0102	Current Ki	1~65535	400	
P1-03	0x0103	Current kd	0~65535	0	
P1-04	0x0104	Current Kc	0~65535	0	
P1-05	0x0105	Speed Kp	1~65535	60	
P1-06	0x0106	Speed Ki	0~65535	0	
P1-07	0x0107	Position Kp	1~65535	2200	
P1-08	0x0108	Position Ki	0~65535	500	
P1-09	0x0109	Counter electromotive force	1~300	50	
P1-10	0x010A	Weak magnetic coefficient	1~100	20	
P1-11	0x010B	Inductance	1~10000	1000	
P1-12	0x010C	Startup delay	1~10	1	
P1-13	0x010D	In-position delay	0~100	3	Unit: ms

Parameter	Address	Meaning	Range	Default	Note
P1-14	0x010E	In-position error	0~100	4	

Group P2: IO configuration parameters

Parameter	Address	Meaning	Range	Default	Note
P2-00	0x0200	Function definition of input port 1	0~65535	141	Bit0 ~ Bit6 function setting 0: Invalid input 1: Trigger function 2: Homing function 3: Emergency stop function 4: Forward jogging 5: Reverse jogging 6: Positive limit 7: Negative limit 8: Origin signal 9: Address 0 10: Address 1 11: Address 2 12: Address 3 13: Enable 14: Alarm clearing 15: Jogging speed 2 Bit7 polarity 0: Normally open signal 1: Normally closed signal
P2-01	0x0201	Function definition of input port 2	0~65535	14	
P2-02	0x0202	Function definition of input port 3	0~65535	2	
P2-03	0x0203	Function definition of input port 4	0~65535	3	
P2-04	0x0204	Function definition of input port 5	0~65535	6	
P2-05	0x0205	Function definition of input port 6	0~65535	7	
P2-06	0x0206	Function definition of output port 1	0~65535	6	Bit0 ~ Bit6 function setting 0: Invalid output 1: Instruction completed 2: Path completed 3: Homing completion 4: In-position completed 5: Brake output 6: Alarm output 7: SD0 8: SD1 9: SD2 10: SD3 11: SD4 12: SD5 13: SD6 15: Z-phase signal output Bit7 polarity 0: Normally open signal 1: Normally closed signal
P2-07	0x0207	Function definition of output port 2	0~65535	5	

Group P3: protection function parameters

Parameter	Address	Meaning	Range	Default	Note
P3-00	0x0300	Tracking error limit	1~32000	4000	4000/circle
P3-02	0x0302	Undervoltage alarm threshold	0~20	0	Default 0 to block alarms

Group P4: motor parameters

Parameter	Address	Meaning	Range	Default	Note
P4-00	0x0400	Peak current	705: 1~70 808: 1~84	705: 70 808: 84	Peak current of motor (0.1A)
P4-02	0x0402	Running direction	0~1	0	0: Counterclockwise 1: Clockwise
P4-03	0x0403	Rotation detection threshold	0~65535	1	Threshold for detecting rotation, unit: rpm
P4-04	0x0404	Z-signal output holding time	1~65535	2	Z-signal output holding time, unit: ms

Group P7: communication parameters

Parameter	Address	Meaning	Range	Default	Note
P7-00	0x0700	Driver station number	1~127	1	When SW1-SW5 are all OFF, this parameter is valid

Group P8: curve collection

Parameter	Address	Meaning	Range	Default	Note
P8-00	0x0800	Sampling channel 1	0~65535	8001	
P8-01	0x0801	Sampling channel 2	0~65535	8003	
P8-02	0x0802	Sampling channel 3	0~65535	0	
P8-03	0x0803	Sampling channel 4	0~65535	0	
P8-04	0x0804	Sampling channel 5	0~65535	8002	
P8-05	0x0805	Sampling channel 6	0~65535	8004	
P8-06	0x0806	Sampling channel 7	0~65535	0	
P8-07	0x0807	Sampling channel 8	0~65535	0	
P8-08	0x0808	Sampling channel 9	0~65535	1008	
P8-09	0x0809	Sampling channel 10	0~65535	1009	
P8-10	0x080A	Sampling channel 11	0~65535	0	
P8-11	0x080B	Sampling channel 12	0~65535	0	
P8-12	0x080C	Sampling channel 13	0~65535	0	
P8-13	0x080D	Sampling channel 14	0~65535	0	
P8-14	0x080E	Sampling channel 15	0~65535	0	
P8-15	0x080F	Sampling channel 16	0~65535	0	

Parameter	Address	Meaning	Range	Default	Note
P8-16	0x0810	Sampling mode	0~8	1	0: None 1: Manual 2: Automatic 3: Conditional triggering 4: Enable triggering 5: Error triggering
P8-17	0x0811	Sampling interval	1~65535	36	
P8-18	0x0812	Sampling time	0~65535	1024	
P8-19	0x0813	Triggering channel	0~65535	0	
P8-20	0x0814	Triggering threshold low bit	0~65535	0	
P8-21	0x0815	Triggering threshold high bit	0~65535	0	
P8-22	0x0816	Triggering slope	0~65535	0	
P8-23	0x0817	Sampling proportion	0~100	100	

Group P9: function parameters

Parameter	Address	Meaning	Range	Default	Note
P9-00	0x0900	PR control setting	0~31	0	Bit0: CTRG 0: rising edge trigger 1: double edge trigger Bit1: 0: soft limit invalid 1: soft limit valid Bit2: 0: power on homing invalid 1: power on homing valid Bit3: 0: voltage level triggering invalid 1: voltage level triggering valid (When the voltage level triggering is valid, both the Bit0 trigger method and the 485 communication trigger will be invalid)
P9-01	0x0901	Triggering register	-32768~+32767	0	Writing 0x21 to address 0x0901 can set the current point to zero
P9-02	0x0902	Positive limit (low bit)	0~65535	0	software limit positive direction position low bit, software limit is invalid when homing

Parameter	Address	Meaning	Range	Default	Note
P9-03	0x0903	Positive limit (high bit)	0~65535	0	software limit positive direction position high bit, software limit is invalid when homing
P9-04	0x0904	Negative limit (low bit)	0~65535	0	software limit reverse direction position low bit, software limit is invalid when homing
P9-05	0x0905	Negative limit (high bit)	0~65535	0	software limit reverse direction position high bit, software limit is invalid when homing
P9-06	0x0906	Homing mode	-32768~+32767	0	Bit0 homing direction 0: reverse 1: forward Bit1 whether moving to specified position after homing 0: no 1: yes Bit2~3 homing mode 0: position limit homing 1: origin homing 2: stall homing 3: Z-phase homing
P9-07	0x0907	Origin position (low bit)	0~65535	0	Cannot be modified
P9-08	0x0908	Origin position (low bit)	0~65535	0	Cannot be modified
P9-09	0x0909	Origin offset position (low bit)	0~65535	0	Cannot be modified
P9-10	0x090A	Origin offset position (high bit)	0~65535	0	Cannot be modified
P9-11	0x090B	Homing high speed	1~6000	200	Homing first segment of speed, unit: rpm
P9-12	0x090C	Homing low speed	1~6000	50	Homing second segment of speed, unit: rpm
P9-13	0x090D	Homing acceleration time	1~32767	100	Homing acceleration time, in milliseconds (acceleration time required per 1000rpm)
P9-14	0x090E	Homing deceleration time	-32768~+32767	100	Homing deceleration time, in milliseconds (deceleration time required per 1000rpm)
P9-15	0x090F	Homing overtravel	0~32767	0	If the homing is equal to the alarm distance of 0, there will be no alarm, with a unit of 0.1

Parameter	Address	Meaning	Range	Default	Note
					circle; After setting the homing overtravel, even if the homing process has not been completed, the motor will stop after the set distance has been traveled
P9-16	0x0910	Limit emergency stop time	1~32767	10	Deceleration time after limit, unit: ms
P9-17	0x0911	Emergency stop time	1~32767	50	Deceleration time after emergency stop, unit: ms
P9-18	0x0912	IO combination triggering mode	0~7	0	0: IO combination trigger (default) 2: IO combination trigger, homing OK is valid 4: IO combination trigger, no need to homing (recommended)
P9-19	0x0913	IO combination filter	0~32767	0	Unit: ms
P9-20	0x0914	S code current output value	0~32767	0	
P9-22	0x0916	JOG speed 1	-2500~+2500	50	Unit: rpm
P9-23	0x0917	JOG speed 2	-2500~+2500	200	Unit: rpm
P9-24	0x0918	JOG acceleration time	0~32767	1000	Unit ms (acceleration time required per 1000rpm)
P9-25	0x0919	JOG deceleration time	0~32767	1000	Unit ms (deceleration time required per 1000rpm)
P9-26	0x091A	Command position (low bit)	-2147483648~ +2147483648	0	The current position of the command is reset to zero after homing successfully
P9-27	0x091B	Command position (high bit)	-2147483648~ +2147483648	0	The current position of the command is reset to zero after homing successfully
P9-28	0x091C	Motor position (low bit)	-2147483648~ +2147483648	0	The current position of the command is reset to zero after homing successfully
P9-29	0x091D	Motor position (high bit)	-2147483648~ +2147483648	0	The current position of the command is reset to zero after homing successfully
P9-30	0x091E	S-code output setting for path 0	-32768~+32767	0	
P9-31	0x091F	S-code output setting for path 1	-32768~+32767	0	
P9-32	0x0920	S-code output setting for	-32768~+32767	0	

Parameter	Address	Meaning	Range	Default	Note
		path 2			
P9-33	0x0921	S-code output setting for path 3	-32768~+32767	0	
P9-34	0x0922	S-code output setting for path 4	-32768~+32767	0	
P9-35	0x0923	S-code output setting for path 5	-32768~+32767	0	
P9-36	0x0924	S-code output setting for path 6	-32768~+32767	0	
P9-37	0x0925	S-code output setting for path 7	-32768~+32767	0	
P9-38	0x0926	S-code output setting for path 8	-32768~+32767	0	
P9-39	0x0927	S-code output setting for path 9	-32768~+32767	0	
P9-40	0x0928	S-code output setting for path 10	-32768~+32767	0	
P9-41	0x0929	S-code output setting for path 11	-32768~+32767	0	
P9-42	0x092A	S-code output setting for path 12	-32768~+32767	0	
P9-43	0x092B	S-code output setting for path 13	-32768~+32767	0	
P9-44	0x092C	S-code output setting for path 14	-32768~+32767	0	
P9-45	0x092D	S-code output setting for path 15	-32768~+32767	0	
P9-46	0x092E	Repetitive teaching times			Display of the upper computer software trial operation interface
P9-47	0x092F	Torque homing time	1~65536	1	Retention time of torque homing, unit: ms
P9-48	0x0930	Torque homing value	1~100	17	The force value of the torque homing mode, the stepper is the set current percentage, unit: %

Group P10: path configuration parameters

Parameter	Address	Meaning	Range	Default	Note
P10-00 + n*8	0x0A00 + n*8	Motion mode path 0~15	-32768~+32767	0	Corresponding functions can be selected for different bit settings: Bit0-3: TYPE

Parameter	Address	Meaning	Range	Default	Note
					0: no action 1: positioning 2: speed operation 3: homing Bit4: INS 0: can be interrupted (default) 1: shield the interruption Bit5: OVLP 0: Non overlapping 1: Overlap Bit6: 0: aboslute position 1: relative position Bit7: (Only effective in speed mode, i.e. Bit0-3=2) 0: reverse operation 1: forward operation Bit8-11: When the value is 0-15, jump to the corresponding path Bit14: JUMP 0: not jump 1: jump
P10-01 + n*8	0x0A01 + n*8	Position (low bit)	0~65535	0	Bit 31 0: positive direction 1: negative direction
P10-02 + n*8	0x0A02 + n*8	Position (high bit)	0~65535	0	
P10-03 + n*8	0x0A03 + n*8	Operation speed	-6000~+6000	0	Operation speed, rpm
P10-04 + n*8	0x0A04 + n*8	Acceleration time	1~32767	100	Unit ms (acceleration time required per 1000rpm)
P10-05 + n*8	0x0A05 + n*8	Deceleration time	1~32767	100	Unit ms (deceleration time required per 1000rpm)
P10-06 + n*8	0x0A06 + n*8	Pause time	-32768~+32767	0	The pause time after the instruction stops
Note: n is the value of path P, P=0~15.					

Group U0 parameters

Parameter	Address	Content		Note
U0-00	0x1000	Given speed		rpm
U0-01	0x1001	Feedback speed		rpm
U0-02	0x1002	Total number of encoders	0~15 bits	
U0-03	0x1003		16~31 bits	
U0-04	0x1004		32~47 bits	
U0-05	0x1005		48~62 bits 63: direction bit	
U0-06	0x1006	Total number of feedback pulses	0~15 bits	
U0-07	0x1007		16~31 bits	
U0-08	0x1008		32~47 bits	
U0-09	0x1009		48~62 bits 63: direction bit	
U0-10	0x100A	Total number of pulses	0~15 bits	
U0-11	0x100B		16~31 bits	
U0-12	0x100C		32~47 bits	
U0-13	0x100D		48~62 bits 63: direction bit	
U0-14	0x100E	Position deviation	0~15 bits	
U0-15	0x100F		16~31 bits	
U0-16	0x1010	Single turn encoder counting	0~15 bits	
U0-17	0x1011		16~31 bits	
U0-18	0x1012	Single turn pulse counting	0~15 bits	
U0-19	0x1013		16~31 bits	
U0-20	0x1014	Pulse turns	0~15 bits	
U0-21	0x1015		16~31 bits	
U0-22	0x1016	Encoder turns	0~15 bits	
U0-23	0x1017		16~31 bits	
U0-24	0x1018	Feedback electrical angle		
U0-25	0x1019	Given electrical angle		
U0-26	0x101A	A-phase feedback current		mA
U0-27	0x101B	B-phase feedback current		mA
U0-28	0x101C	Reference feedback current		mA
U0-29	0x101D	Given current of phase A		mA
U0-30	0x101E	Given current of phase B		mA
U0-31	0x101F	Reference given current		mA
U0-32	0x1020	Bus voltage		V
U0-35	0x1023	Motor position (low bit)		
U0-36	0x1024	Motor position (high bit)		
U0-37	0x1025	Current status		Drive in path state: displays the previously set S code
U0-38	0x1026	Error status		0x102: homing overtravel 0x200: path software limit

Parameter	Address	Content	Note
			0x300: jogging limit 0x400: IO configuration conflict
U0-39	0x1027	Triggering status	0x10P (P: 0~F)
U0-40	0x1028	PR mode IO status	Bit0~Bit15: Using condition of input function signals

Group U1 monitoring parameters

Parameter	Address	Content	Note
U1-00	0x1100	Current alarm code	
U1-01	0x1101	A-phase current at the time of alarm occurrence	
U1-02	0x1102	B-phase current at the time of alarm occurrence	
U1-03	0x1103	Reference current when an alarm occurs	
U1-04	0x1104	Bus voltage at the time of alarm occurrence	
U1-05	0x1105	Position deviation when alarm occurs	
U1-06	0x1106	Speed value at the time of alarm occurrence	
U1-07	0x1107	The time when the alarm occurred	
U1-08	0x1108	The time when the alarm occurred	
U1-09	0x1109	The number of error codes for this operation	
U1-10	0x110A	The second recent alarm code	
U1-11	0x110B	The third recent alarm code	
U1-12	0x110C	The 4th recent alarm code	
U1-13	0x110D	The 5th recent alarm code	
U1-14	0x110E	The 6th recent alarm code	
U1-15	0x110F	Reserved	
U1-16	0x1110	Reserved	
U1-17	0x1111	Reserved	
U1-18	0x1112	Reserved	
U1-19	0x1113	Reserved	
U1-20	0x1114	Reserved	
U1-21	0x1115	Reserved	

Group U2 monitoring parameters

Parameter	Address	Content	Note
U2-00	0x1200	Number of power on times	
U2-01	0x1201	Machine type	
U2-02	0x1202	Series	
U2-03	0x1203	Model	
U2-04	0x1204	Date of production	Year
U2-05	0x1205	Date of production	Month
U2-06	0x1206	Date of production	Day
U2-07	0x1207	Software version	
U2-08	0x1208	Hardware version	

Parameter	Address	Content	Note
U2-09	0x1209	Power on operation time	Hour
U2-10	0x120A	Power on operation time	Minute
U2-11	0x120B	Power on operation time	Second
U2-12	0x120C	Equipment serial number	Low 16-bit
U2-13	0x120D	Equipment serial number	High 16-bit
U2-14	0x120E	Firmware generation date: year	
U2-15	0x120F	Firmware generation date: month/day	
U2-16	0x1210	Firmware generation date: hour/minute	

7 Troubleshooting

Flashing information	Fault description	Possible reasons and solutions
Flashing once	Overcurrent or short circuit	Check if the power cable is short circuited
Flashing continuously twice	Overvoltage	Check if the power supply voltage exceeds the alarm threshold
Flashing continuously for 3 times	Undervoltage	Check if the power supply voltage is lower than the value of P3-02, default to 0 to block this alarm
Flashing continuously for 4 times	Motor open circuit or poor contact	Check if the power cable is properly installed or disconnected
Flashing continuously for 5 times	Position exceeds the limit	Check if the encoder cable is broken, check if the motor is stuck, and extend the acceleration time appropriately
Flashing continuously for 6 times	Motor parameter self-tuning error	Use the upper computer software to close the self-tuning function
Flashing continuously for 12 times	Blockage protection	Check if there is any blockage in the machine. P0-16 can be set to 0 and the blockage detection function can be turned off
Flashing continuously for 15 times	PR alarm	Process according to the alarm information in the PR status bar (U0-38)

- The overvoltage voltage value of DP3S-705 is DC60V, and the overvoltage voltage values of DP3S-808A are AC106V and DC150V;
- Due to the DP3S-705 driver not having the function of reverse polarity protection for power supply, please confirm again before powering on that the positive and negative terminals of the power supply are correctly connected.

Xinje Wechat

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