

XD/XL series PLC

User manual [positioning control]

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Data no. PD02 20170518 3.4



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Version 1

• Basic explanation

Thank you for purchasing Xinje XD/XL series PLC.

This manual mainly introduces XD/XL series PLC instructions.

Please read this manual carefully before using and wire after understanding the content.

About software and programming instructions, please refer to related manuals.

Please hand this manual over to operation users.

• Notices for users

Only experienced operator can wire the plc. If any problem, please contact our technical department.

The listed examples are used to help users to understand, so it may not act.

Please confirm that PLC specifications and principles are suitable when connect PLC to other products. Please conform safety of PLC and machines by yourself when use the PLC. Machines may be damaged by PLC errors.

• Responsibility declaration

The manual content has been checked carefully, however, mistakes may happen.

We often check the manual and will correct the problems in subsequent version. Welcome to offer advices to us.

Excuse us that we will not inform you if manual is changed.

• Contact information

If you have any problem about products, please contact the agent or Xinje company. Tel: 0086 510-85134136 85123803 Fax: 0086 510-85111290 Address: Building 7 fourth floor, No.100, Dicui Rd, Wuxi, China. Code: 214072

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2015, 5, 12

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Preface

———positioning control

This manual is XD/XL series PLC positioning control manual, it introduces pulse output and motion control function, is suitable for XD2, XD3, XD5, XDM, XDC, XD5E, XDME, XDH, XL3, XL5, XL5E, XLME series PLC (XD1 and XL1 have no positioning function).

1. XD/XL series PLC features:

> Faster instruction processing speed

XD/XL series PLC instruction processing speed is $12\sim15$ times faster than XC series, especially for the floating number instruction, the unit of scanning period is μ s.

> Up to 10 to 16 modules and 2 BD cards, 1 ED module can be extended

Similar to XC series PLC, XD3, XD5, XDM, XDC, XD5E series PLC also support extension module and BD card (XD1/XD2 cannot extend module and BD card, XDH cannot extend ED and BD), including digital, analog, temperature module. The extension modules can be 10 or 16, BD card 1 or 2.

XL series PLC can support 10 right extension modules, 1 left extension ED module.

> Compatible with most functions of XC series

XD/XL series PLC support most basic functions of XC series PLC.

> Compatible with XC series program

XD/XL series PLC software XDPPro can open the program of XC series PLC, but some different instructions will be shown in red colors, user only needs to modify this part of program.

> XL has compact size

XL series PLC is card type PLC, with a thinner and smaller appearance, which can greatly save the installation space.

> X-NET fieldbus

XD/XL PLC supports xnet fieldbus communication, which can realize fast and stable communication to XD/XL PLC and TG/TN touch screen. XDC series PLC supports the function of x-net motion bus and can control 20-axis synchronous motion.

Ethernet communication

Ethernet PLC has RJ45 port and supports TCP/IP protocol. It can realize MODBUS-TCP communication and free format communication based on Ethernet. Supports program download, online monitoring, remote monitoring, and communication with other TCP/IP devices.

EtherCAT bus

XDH series PLC supports EtherCAT bus function, and can control 32 axes synchronously, with synchronization period ≤ 1 ms.

2. Product models

XD1 series models:

- XD1-16R/T-E/C
- XD1-32R/T-E/C

XD2 series models:

- XD2-16R/T-E/C
- XD2-24R/T/RT-E/C
- XD2-32R/T/RT-E/C
- XD2-48R/T/RT-E/C
- XD2-60R/T/RT-E/C

XD3 series models:

- XD3-16R/T/RT-E/C, XD3-16PT-E/C
- XD3-24R/T/RT-E/C, XD3-24PR/T/RT-E/C
- XD3-32R/T/RT-E/C, XD3-32PR/T/RT-E/C
- XD3-48R/T/RT-E/C, XD3-48PT-E/C
- XD3-60R/T/RT-E/C, XD3-60PT-E/C

XD5 series models:

- XD5-16R/T-E/C
- XD5-24R/T/RT-E/C, XD5-24T4-E/C
- XD5-32R/T/RT-E/C, XD5-32T4-E/C
- XD5-48R/T/RT-E/C
- XD5-60R/T/RT-E/C
- XD5-48T4-E/C
- XD5-48T6-E/C
- XD5-60T4-E/C
- XD5-60T6-E/C
- XD5-60T10-E/C

XDM series models:

- XDM-24T4-E/C, XDM-24PT4-E/C
- XDM-32T4-E/C, XDM-32PT4-E/C
- XDM-60T4-E/C
- XDM-60T10-E/C, XDM-60PT10-E/C
- XDM-60T4L-E

XDC series models:

- XDC-24T-E/C
- XDC-32T-E/C
- XDC-48T-E/C
- XDC-60T-E/C

XD5E series models:

- XD5E-30T4-E
- XD5E-60T10-E

XDME series models:

• XDME-60T10-E

XDH series models:

- XDH-60T4-E
- 3. XL series PLC

XL1 serise PLC:

• XL1-16T, XL1-16T-U

XL3 serise PLC:

• XL3-16R/T, XL3-16PR, XL3-32T

XL5 serise PLC:

• XL5-16T, XL5-32T, XL5-32T4

XL5E serise PLC:

• XL5E-16T, XL5E-32T, XL5E-32T4, XL5E-64T6

XLME serise PLC:

• XLME-32T4

4. Version requirements

XD series PLC: XDPpro software v3.2 and up.

XL series PLC: XDPpro software v3.5 and up.

Part of the instructions have version requirements, please refer to the instruction details.

1 Pulse output

Pulse output instruction list:

instruction	function	Instruction writing format	chapter
Pulse output			
PLSR	Multi-segment pulse output	PLSR S0 S1 S2 D	1-2-2
PLSF	Variable frequency pulse output	PLSF S0 S1 D	1-2-3
DRVI	Relative single segment positioning	DRVI S0 S1 S2 D1 D2	1-2-4
DRVA	Absolute single segment positioning	DRVI S0 S1 S2 D1 D2	1-2-5
ZRN	Mechanical return zero	ZRN S0 D	1-2-6
STOP	Stop pulse	TOP S0 S1	1-2-7
GOON	Continue to output pulse	GOON Yn	1-2-8

1-1. Function overview

XD2, XD3, XD5 (except XD5-48T6/60T6), XDC, XL3 series PLC have 2 channels of pulse output. XD5-48T6/60T6, XDM, XD5E series PLC have 4~10 channels of pulse output. The different pulse functions include single direction pulse output with or without acceleration, multi-segment double direction pulse output. The max output frequency can up to 100KHz.

Note: as XC series PLC cannot write two or more pulse output instructions for same terminal in main program or process. But XD series PLC has no problem cause its condition is edge-triggered.

PLC model	Pulse	Pulse output	output	Output	Output format
	channels	terminal	frequency	mode	
XD2-16T/RT					
XD2-24T/RT				Open	
XD2-32T/RT	2	Y0, Y1	0~100KHz	collector	Pulse+direction
XD2-48T/RT					
XD2-60T/RT					
XD3-16T/RT				Open	Pulse+direction
XD3-24T/RT				collector	
XD3-32T/RT	2	Y0, Y1	0~100KHz		
XD3-48T/RT					
XD3-60T/RT					
XD5-16T/RT				Open	Pulse+direction
XD5-24T/RT				collector	
XD5-32T/RT	2	Y0, Y1	0~100KHz		
XD5-48T/RT					
XD5-60T/RT					
XD5-24T4				Open	Pulse+direction
XD5-32T4	4 Y0, Y1, Y	Y0, Y1, Y2, Y3	0~100KHz	collector	
XD5-48T4	7	10, 11, 12, 15	0°100KHZ		
XD5-60T4					
XD5-48T6	6	Y0, Y1, Y2, Y3, Y4,	0~100KHz	Open	Pulse+direction
XD5-60T6	0	Y5	0~100KHZ	collector	
		Y0, Y2, Y4, Y6		Differential	Pulse+direction
XD5-48D4T4	8	Y0/Y1, Y2/Y3,	0~920KHz		AB phase
ADJ-40D414	0	Y4/Y5, Y6/Y7	0~920K11Z		
		Y10, Y12, Y14, Y16			Pulse+direction
VD5 (0T10	10	Y0, Y1, Y2, Y3, Y4,	0 100211	Open	Pulse+direction
XD5-60T10	10	Y5, Y6, Y7, Y10, Y11	0~100KHz	collector	
XDM-24T4				Open	Pulse+direction
XDM-32T4	4	Y0, Y1, Y2, Y3	0~100KHz	collector	
XDM-60T4					

Pulse output terminal:

XDM-60T4L					
XDM-60T10	10	Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y10, Y11	0~100KHz	Open collector	Pulse+direction
XDC-24T XDC-32T XDC-48T XDC-60T	2	Y0, Y1	0~100KHz	Open collector	Pulse+direction
XD5E-24/30/ 48/60T	2	Y0, Y1	0~100KHz	Open collector	Pulse+direction
XD5E-30/60T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XD5E-60T6	6	Y0, Y1, Y2, Y3, Y4, Y5	0~100KHz	Open collector	Pulse+direction
XD5E-60T10	10	Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y10, Y11	0~100KHz	Open collector	Pulse+direction
XDME-60T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XDME-60T10	10	Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y10, Y11	0~100KHz	Open collector	Pulse+direction
XDH-60T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XL3-16/32T	2	Y0, Y1	0~100KHz	Open collector	Pulse+direction
XL5-16/32T	2	Y0, Y1	0~100KHz	Open collector	Pulse+direction
XL5-32T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XL5E-16/32T	2	Y0, Y1	0~100KHz	Open collector	Pulse+direction
XL5E-32T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XLME-32T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XL5E-64T6	6	Y0, Y1, Y2, Y3, Y4, Y5	0~100KHz	Open collector	Pulse+direction

Note:

 \approx 1: all the pulse can output frequency 100~200KHz, but not all the servo can work well, please connect 500 Ω resistor between output and 24V power supply.

 \approx 2: the direction terminal can be set to any terminal except pulse output terminal when using positioning instruction.

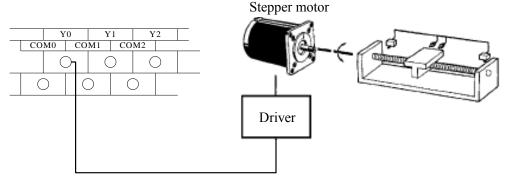
3: pulse output terminal transistor response time is below 0.5µs, other transistors is below 0.2ms.

X4: the pulse output terminal can be used to pulse direction output when it has no pulse output.

%5: For differential pulse output, if pulse + direction mode is adopted, transistor or differential output terminal can be selected as direction terminal (differential output terminal +, - should be connected); if it is in AB phase mode, terminals must be used in pairs, such as Y0 and Y1. See the table above for specific distribution.

Load current

Please make the open collector transistor output load current in the range of 10~100mA (DC5~24V) when the basic unit (transistor output type) pulse output terminal is used to pulse output or positioning instruction.



Note:

- *1: please use transistor terminal for pulse output. Such as XD3-16T-E or XD3-60T-E.
- *2: it can choose any terminals for direction output except pulse output terminal.
- ※3: the pulse direction temirnal will keep the state after the pulse output finished. if the state is ON, it will keep ON after pulse output finished. if the pulse output instruction does not have direction, user can control the direction terminal state by manual. If the pulse output instruction has direction, the instruction will automatically control the direction terminal.
- %4: the pulse output terminal LED will slight light when the pulse is outputting. Because the pulse is 50% empty square wave, so the LED will light in half of the period and off in another half of period.
- %5: the pulse output terminal Yn will be ON in software when the pulse is outputting, and it will be OFF when the pulse output finished.

1-2. Pulse output type and instruction application

1-2-1. Pulse parameter and configuration

XD/XL series PLC pulse output function needs to configure the pulse data, user parameters and system parameters. This chapter will introduce all the parameters and configuration methods. Now we take PLSR instruction as an example.

PLSR instruction write format:



Click **m** in the software or right click the PLSR instrution in the program to open the configuration window of PLSR.

			r	nulti section p	ulse output					×
_		<u>S0</u>			-	<u>S2</u>				
dat	a start	address: HD0	user params addres	ss: HD100	system params:	К1	output:	Y0		
mo	de:	relative v	start execute section	on count: 0	Config					
A	dd C	elete Upwards D	ownwards							
		frequence	pulse	count	wait condition		wa regi		jump register	
•	1	1000	10	00	ACT time		К30	00	КЗ	
	2	2000	30	00	wait signal		M1	0	K1	
	3	2000	-30	ים 000	ılse sending com	nplete	KO)	K2	
used	l space	e: HD0-HD39,HD10	0-HD103	Rea	d From PLC V	Vrite To PLC		ОК	Cancel	

Configuration table:

Configuration item	Function
Data start address	Pulse data parameter address, occupied [S0] ~ [S0+N*10+8]
	(double words, N is pulse segment no.), store the pulse total segment
	number, pulse numbers, wait condition, register type and number,
	jump register type and number
User parameter address	User parameter address, occupied $[S1] \sim [S1+2]$ (double words),
	store the mode (relative/absolute), starting execute segment no.
System parameter	Choose which group of parameters, each pulse output terminal can
	set four group of parameters, the default is K1 (group 1)
Mode	Relative, absolute mode, default is relative mode
Start execute section count	PLSR executed from which segment, default is 0 (start from
	segment 1)
Config	Set the system parameters which are saved in special Flash register
	SFD900~SFD2193, it can set 4 groups of parameters of 10 pulse
	output terminals

1-2-1-1. Pulse data parameters (S0)

The pulse data parameters are set in the address starting from S0, please refer to the following table:

Address	Contents	Remark
S0+0 (double words)	Pulse total segment number (1~100)	
S0+2 (8 words)	Reserved (8 words)	
S0+10 (double words)	Segment 1 pulse frequency	
S0+12 (double words)	Segment 1 pulse number	
S0+14	 High 8-bit: 【wait condition】 (set when to send the next segment of pulse) H00: pulse output finished ("H" means hex format) H01: wait time H02: wait signal H03: ACT time H04: EXT signal or pulse output finished Low 8-bit: 【wait condition register type】 (use together with 【wait condition】) H00: constant H01: D H02: HD H03: FD H04: X H05: M H06: HM 	Segment 1
S0+15 (double words)	【 constant/register number (wait condition)】, use together with 【 wait condition 】, 【 wait condition register type】	
S0+17	Low 8-bit: (jump register type) (set the next pulse segment no.) H00: constant H01: D H02: HD H03: FD	
S0+18 (double words)	[constant/jump register number], use together with [jump register type]	
S0+N*10+0 (double words)	Segment N pulse frequency	
S0+N*10+2 (double words)	Segment N pulse numbers	
S0+N*10+4	Wait condition, wait condition register type	Segment N
S0+N*10+5 (double words)	Constant or register number (wait condition)	
S0+N*10+7	Jump register type	
S0+N*10+8 (double words)	Constant or register number (jump register)	

• Data starting address S0

Note:

%1: pulse frequency is positive value (\geq 0), the value become larger is acceleration, become

smaller is deceleration, it is not related to the pulse direction.

%2: pulse numbers can be positive or negative value, negative value means reverse direction pulse.

■ Wait condition (【S0+14】 high 8-bit)

To set when to enter next segment of pulse.

• Pulse sending finished (H00)

Jump to the setting pulse segment after executing this segment of pulse.

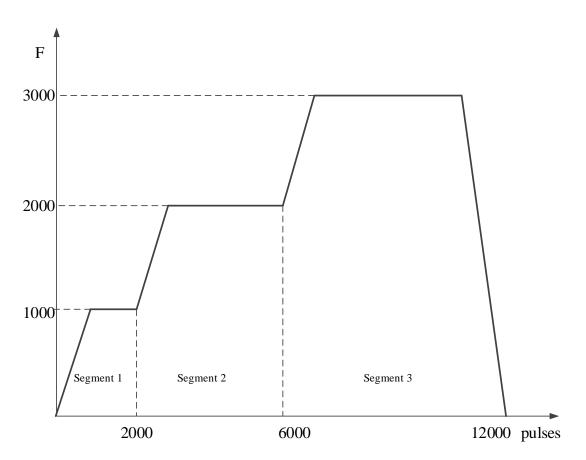
Example 1:

When the pulse intruction PLSR is triggered, it will send segment 1 2000 pulses with the speed 1000Hz, and jump to segment 2 at once after segment 1 finished. Segment 2 is 4000 pulses with speed 2000Hz. Then it will jump to segment 3 at once after semgent 2 finished. Segment 3 has 6000 pulses.

Configuration window:

					multi see	ction pu	lse output				
		user params	arams address: HD100 system params: K1				output:	output: Y0			
mode: relative V start exe				start execute	e section count:	0	Config				
Ac	dd D	elete L	Jpwards Do	ownwards							
Γ			frequence		pulse count		wait condition		wa regi		jump register
	1		1000		2000	թվ	se sending comp	lete	K)	KO
	2	2		2000		4000 pulse sending complete	000 pulse sending complete KO	KO	KO	KO	
۰	3		3000		6000	թվ	se sending comp	lete	K)	KO
used	space	: HD0	-HD39,HD10	0-HD103		Read	From PLC W	rite To PL	c	ок	Cancel

Multi-segment pulse configuration



Multi-segment sequence control pulse wave

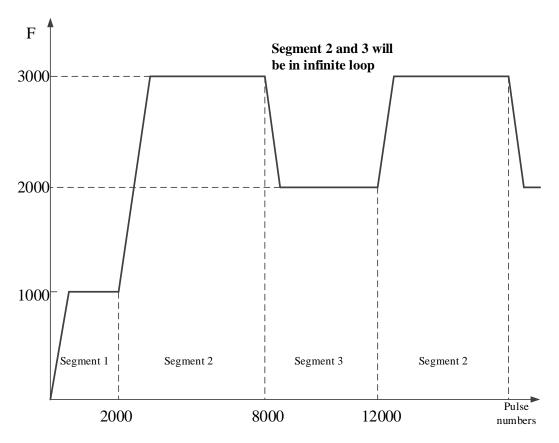
Example 2:

When the pulse instruction PLSR is triggered, it will send 2000 pulses with the speed 1000Hz, and jump to segment 3 to send 6000 pulses with the speed 3000Hz, then jump to segment 2 to send 4000 pulses, then jump to segment 3 to repeat the cycle.

The configuration window:

data start address: HDO user para mode: relative ✓ start exe		rt execute section count:	0 Config		
Add D	elete Upwards Down	wards	· · · · · · · · · · · · · · · · · · ·		
	frequence	pulse count	wait condition	wait register	jump register
1	1000	2000	pulse sending complete	KO	КЗ
2	2000	4000	pulse sending complete	KO	KO
▶ 3	3000	6000	pulse sending complete	KO	K2
2	2000	4000	KO	KO	

Multi-segment pulse output configuration table



Multi-segment pulse sending diagram

Note:

%1: the acceleration deceleration time can be set in [config] list, all the parameter details are in [config guide].

 ≈ 2 : 【jump register】 set to K0, it will jump to the next segment. If it is not 0, it will jump to corresponding segment. For example, K3 will jump to segment 3.

3: when setting multi-segment of pulse, and **(**jump register **)** is set, endless pulse outputting loop should be avoided.

• Wait time (H01)

It starts to timing after present pulse segment end, it will jump to appointed segment when the time is up. The time can be constant or register D, HD, FD. The unit is ms.

For example:

When the relative mode pulse instruction PLSR is triggered, it sends 2000 pulses with the speed of 1000Hz, it will delay 200ms after segment 1 end then jump to segment 2. It sends 4000 pulses with the speed 2000Hz, it will delay the time of D100 (if D100=100, it will delay 100ms), then jump to segment 3 which will send 6000 pulses.

Configurations:

lata	start	address:	HD0	user para	ams address:	HD100	system params:	K1	output:	Y0	
mode: relative 🗸 start ex		start exe	art execute section count:		Config						
Ad	ld C	elete U	Jpwards Do	ownwards	5						
			frequence		pulse count		wait condition		wa regi		jump register
	1		1000		2000 wait time			K200		KO	
	2		2000		4000		wait time		D100		KO
Þ	3		3000		6000	թո	se sending comp.	lete	K)	KO

F 3000 2000 2000 1000 Segment 1 2000 Segment 2 4000 Delay 200ms Delay 200ms Delay 200ms

Pulse sending diagram

Note:

%1: the acceleration deceleration time can be set in [config] list, all the parameter details are in [config guide].

2: delay time range: 1~32767ms, set to 0 will be seemed to 1ms.

X3: if the delay time is over 32767ms, please use two pulse instructions, and timer between them.

• Wait signal (H02)

It will wait for the wait signal after pulse sending finished. When the signal is ON or from OFF to ON, it will jump to appointed segment. The wait signal can be X, M, HM and so on.

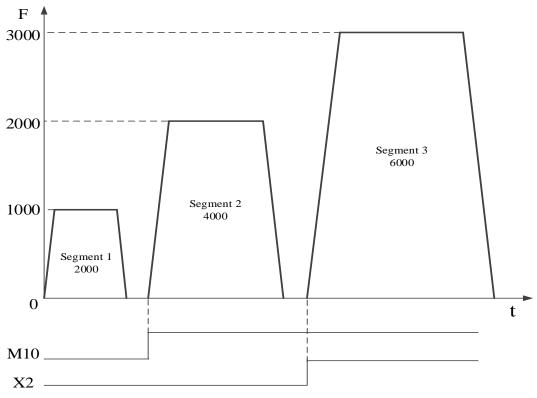
For example:

When the relative mode pulse instruction is triggered, it will send 2000 pulses with the speed 1000Hz, after segment 1 finished, it will wait for the M10 from OFF to ON, then jump to segment 2 which will send 4000 pulses with the speed 2000Hz, it will wait for X2 from OFF to ON, then jump to segment 3 which will send 6000 pulses.

Configurations:

node:	relative 🗸 start	execute section count:	0 Config		
Add Dele	ete Upwards Downw	ards			
	frequence	pulse count	wait condition	wait register	jump register
1	1000	2000	wait signal	M 10	KO
2	2000	4000	wait signal	Х2	KO
▶ 3	3000	6000	pulse sending complete	KO	KO

Multi-segment pulse output configuration table

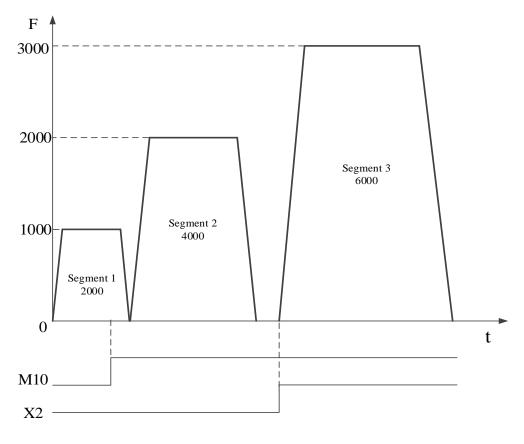


Pulse sending diagram

Note:

%1: the acceleration deceleration time can be set in [config] list, all the parameter details are in [config guide].

%2: if the present segment has not finished, but the wait signal is ON, it will jump to next segment after present segment finished, the wave is shown as below (M10 from OFF to ON in advance)



Pulse sending diagram

※3: if the wait signal is not ON after the present segment finished, it will wait until the signal is ON, then jump to the next segment.

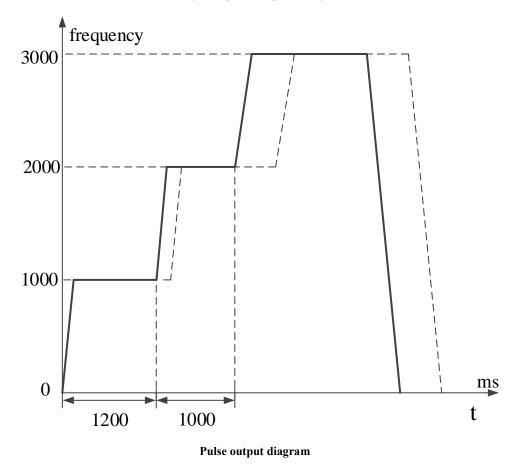
• ACT time (H03)

The pulse will output for the time appointed by ACT time, no matter the pulse sending process is finished or not, it will jump to the next segment at once. ACT time can be constant, or set through register D, HD, FD, the unit is ms.

For example: when the relative mode pulse instruction PLSR is triggered by pulse edge, it will output the first segment of pulse numbers with the speed 1000Hz, when the first segment pulse output time reaches 1200ms, no matter the pulse sending process is finished or not, it will jump to the second segment at once. When the second segment of pulse outputs with the speed 2000Hz and reaches the time setting in D100 (for example D100=1000), no matter the pulse sending process is finished or not, it will jump to the third segment at once and output 6000 pulses. The configuration:

data start ad	Idress: HD0	user params address:	HD100 system params:	K1	output:	Y0	
node:	relative 🗸	start execute section count:	0 Config				
Add Del	ete Upwards Do	ownwards					
	frequence	pulse count	wait condition		wa regi		jump register
1	1000	2000	ACT time		K12	:00	KO
2	2000	4000	ACT time		D10	00	KO
▶ 3	3000	6000	pulse sending com	plete	KI	D	KO

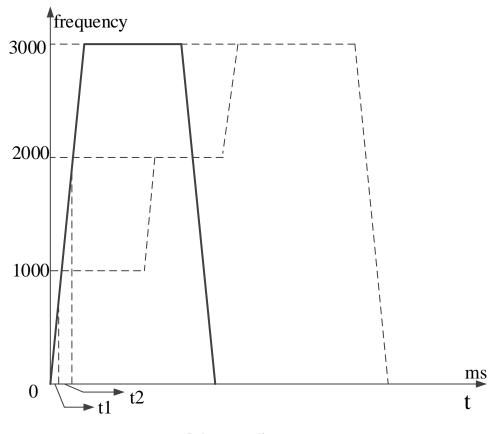
Multi-segment pulse output configuration



Note:

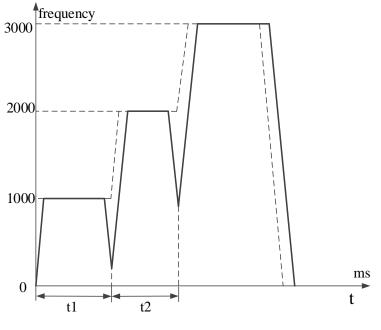
1: the acceleration time and deceleration time can be set in the parameter table, it will be explained in system parameters.

2: if the ACT time is very short and in the acceleration stage of the pulse segment, it will accelerate to the second segment from the position of ACT time reached, the same, it will accelerate to the third segment from the position of ACT time reached. Please see as the below diagram.



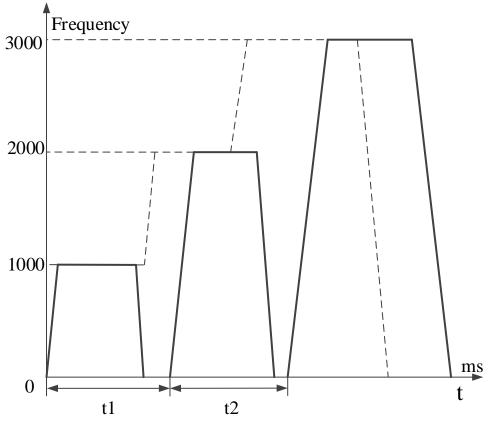
Pulse output diagram

3: if the ACT time is very long, and in the deceleration stage of the pulse segment, it will accelerate to the second segment from the position of ACT time reached, the same, it will accelerate to the third segment from the position of ACT time reached. Please see as the below diagram.



Pulse output digram

4: if the ACT time is very long, and the present pulse segment ends, it will wait the ACT time arrival and start the next segment. Please see the below diagram.



Pulse output diagram

• EXT signal (H04)

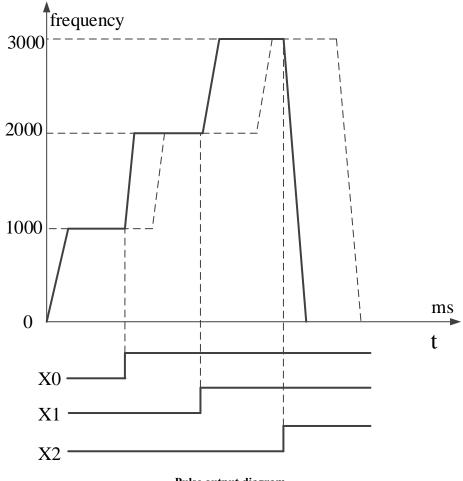
When the pulse is outputting (the pulse numbers have not been sent yet), if external signal is ON, it will jump to the next appointed segment. If the external signal has no action when the present pulse segment ends, it will wait for this signal. The external signal will input from X terminal (the response is higher if using external interruption terminal).

For example: when the relative mode pulse instruction PLSR is triggered by pulse edge, it will output the first segment of pulse numbers with the speed 1000Hz, the external signal inputs from X0 during the pusle is sending, it will jump to segment 2 at once. When the segment 2 pulse is sending with the speed 2000Hz, the external signal inputs from X1, it will jump to segment 3 at once. When the segment 3 pulse is sending with the speed 3000Hz, external signal inputs from X2, it will slow stop the pulse output at once.

The configuration window:

mode:						
		relative 🗸	start execute section count:	0 Config		
Add I	Delete U	Ipwards Do	ownwards	· · ·		
		frequence	pulse count	wait condition	wait register	jump register
1		1000	2000	EXT signal	хо	KO
2		2000	4000	EXT signal	X1	КО
▶ 3		3000	6000	EXT signal	¥2	KO

Multi-segment pulse output configuration



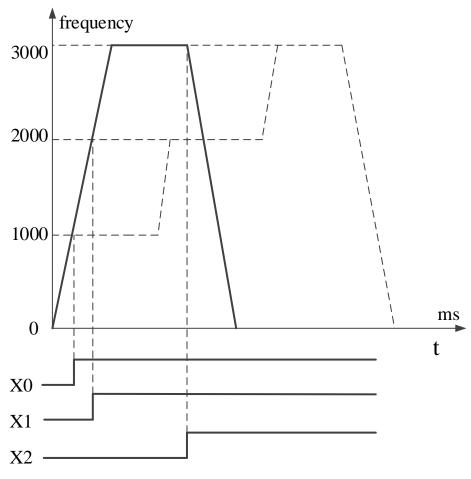
Pulse output diagram

Note:

1: the acceleration and deceleration time can be set in parameter table, please refer to system parameters for details.

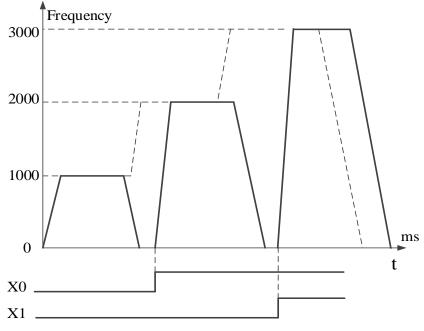
2: the pulse is accelerating when the EXT signal is triggered, it will accelerate from the present position to pulse segment 2. The same, it will accelerate from the present position of EXT singal

triggered to segment 3. As shown of below diagram:



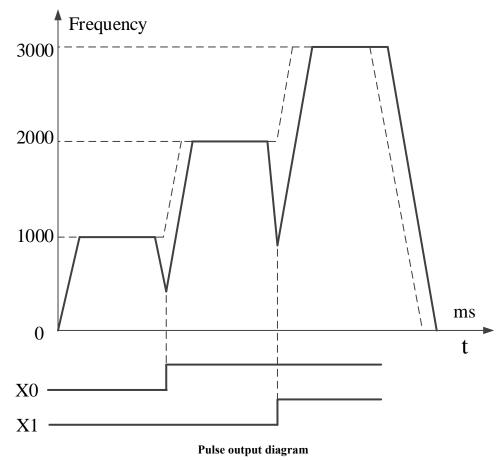
Pulse output diagram

3: if the EXT signal is triggered when the present pulse already ends, it will wait the EXT signal and start the next segment. Refer to below diagram.



Pulse output diagram

4: if the EXT signal is triggered when the pulse is decelearting, it will accelerate from present position to pulse segment 2, the same way, it will accelerate to pulse segment 3 from the position EXT signal is triggered. Refer to below diagram:



• EXT signal/pulse sending complete (H05)

It will jump to appointed segment when the bit signal is triggered or pulse sending completes. If the external signal is triggered before the pulse sending ends, it will jump to appointed segment, otherwise it will jump to appointed segment when present segment finishes (the pulse segment will send pulse as configuration parameters, if there is external EXT signal, it will not continue the present segment but jump to appointed segment). For example:

ata	a start add	ress: HD0	user params address:	HD100	system params:	K1	output:	YO	
nod	e:	relative 🖌	start execute section count:	0	Config]			
Ad	ld Delet	te Upwards Do	ownwards						
		frequence	pulse count		wait condition		wa regi		jump register
	1	1000	2000	EXT sig	nal/pulse sendi	ng com	X)	KO
	2	2000	4000	EXT sig	nal/pulse sendi	ng com	X	1	KO
•	3	3000	6000	EXT sig	nal/pulse sendi	ng com	X	2	KO

Multi-segment pulse configuration

EXT signal X0 is valid when segment 1 pulse is sending(frequency 1000Hz, pulse number 2000), EXT signal X1 is valid when segment 2 pulse is sending(frequency 2000, pulse number 4000), EXT signal X2 is valid when segment 3 pulse is sending(frequency 3000Hz, pulse number 6000).

■ Wait register

• Constant (H00)

The value in register S0+N*10+5 (double word) is constant, range K0~K2147483647, eg. K2, K6, K3000.

• D (H01)

The value in register S0+N*10+5 (double word) is register D, for example, D0, D200.

• HD (H02)

The value in register S0+N*10+5 (double word) is register HD(latched register), for example HD0, HD200.

• FD (H03)

The value in register S0+N*10+5 (double word) is register FD(Flash register), for example, FD0, FD200.

• X (H04)

The value in register S0+N*10+5 (double word) is X(input signal), if the signal is external interruption terminal, the pulse will be triggered by interruption signal(response faster), for example X0, X6.

• M (H05)

The value in register S0+N*10+5 (double word) is M(normal coil), for example, M0, M200.

• HM (H06)

The value is register S0+N*10+5 (double word) is HM(latched coil), for example, HM0, HM200.

■ Jump register

Constant (H00)

The register value in S0+N*10+8 (double word) is constant, range K0~K100, for example K2, K6.

• D (H01)

The value in register S0+N*10+8 (double word) is D(normal register), for example D0, D200.

• HD (H02)

The value in register S0+N*10+5 (double word) is HD(latched register), for example HD0, HD200.

• FD (H03)

The value in register S0+N*10+5 (double word) is FD(Flash register), for example FD0, FD200.

Note:

1: whatever it is constant or register, the value range is K0~K100.

2: this parameter means the present pusle segment ends and jumps to appointed segment. For example, the value is K6, it will jump to pulse segment 6 when the present pulse segment ends.3: if the jump register or constant is 0, it will jump to next segment, if there is no next pulse segment, it will finish the present pulse segment then stop.

4: if the constant or register value is present segment number, it will infinite loop the present pulse segment.

1-2-1-2. Pulse user parameters (S1)

The pulse user parameters start from S1.

The pulse user parameters starting address (S1)

Address	Content
S1+0 (double word)	Pulse relative/absolute mode (0: relative 1: absolute) *1
S1+2 (double word)	Pulse start execution segment number ($1 \sim 100$)* ²

a. Relative/absolute mode

S1+0 (double word) defines the pulse configuration mode is relative or absolute, default is relative mode.

data start address:	D0	user params address:	D100	system params:	K1	output:	YO
mode:	relative 🗸	start execute section count:	0	Config			

For example:

There are 3 segments of pulse, segment 1 is 2000 pulse numbers, 1000Hz, segment 2 is 4000 pulse numbers, 2000Hz, segment 3 is 6000 pulse numbers, 3000Hz. The pulse configuration is shown as below:

		frequence	pulse count	wait condition	wait register	jump register
	1	1000	2000	pulse sending complete	KO	KO
•	2	2000	4000	pulse sending complete	KO	KO
	3	3000	6000	pulse sending complete	KO	KO

Relative mode configuration table

		frequence	pulse count	wait condition	wait register	jump register
	1	1000	2000	pulse sending complete	KO	KO
	2	2000	6000	pulse sending complete	KO	KO
•	3	3000	12000	pulse sending complete	KO	KO

Absolute mode configuration table

b. Start execution segment

Start execution segment means the pulse instruction start segment (the pulse will start from the appointed segment but not segment 1).

Note: if it is set to 0 or 1, it will start from segment 1.

data start address:	D0	user params address:	D100	system params:	K1	output:	YO
mode:	relative v	start execute section count:	0	Config			

For example:

There are three segments of pulse: segment 1 is 1000Hz, 2000 pulse numbers, segment 2 is 2000Hz, 4000 pulse numbers, segment 3 is 3000Hz, 6000 pulse numbers, the start execution segment is 2:

			multi sec	ction pulse output		
data	start address:	HD0 us	er params address:	HD100 system params: K1	output: Y0	
mode	e:	relative ∨ st	art execute section count:	2 Config		
Ad	d Delete l	Jpwards Dowr	nwards			
		frequence	pulse count	wait condition	wait register	jump register
	1	1000	2000	pulse sending complete	КО	KO
	2	2000	4000	pulse sending complete	КО	KO
•	3	3000	6000	pulse sending complete	KO	KO
used :	space: HDO	-HD39,HD100-H	D103	Read From PLC Write To PLC	СОК	Cancel

Multi-segment pulse output configuration table

The PLSR will send 4000 pulse numbers with the speed 2000Hz, then send 6000 pulse numbers with the speed 3000Hz.

1-2-1-3. System parameters (S2)

There are 4 groups of system parameters. User can select one of them to execute the pulse output. Each pulse output terminal has related system parameter address.

User can set the system parameter group no. in S2 (constant, register D, HD, FD...). As the following figure, system parameter group is 2, output terminal is Y0.

data start address:	HD0	user params address:	HD100	system params:	К2	output:	YO
mode:	relative 🗸	start execute section count:	0	Config			

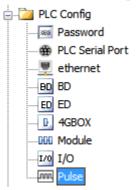
Click "config" button to enter system parameters.

			PLC1 - Pulse Set		x
:	Con	fig 🕶 Delete 🛛 i	init axis 🛛 config guide		
Π	×	Y0 axis		Value	^
Y		Y1 axis	eters setting-Pulse direction logic	positive logic	
Y		Y2 axis	eters setting-enable soft limit	disable	
Y		Y3 axis	eters setting mechanical back to	negative	
Y		Y4 axis	eters setting-Pulse unit	pulse number	
Y		Y5 axis	eters setting-Interpolation coor	Cross coordi	
Y		Y6 axis	send mode	complete	
Y		Y7 axis	num (1)	1	
Y		Y10 axis	t (1)	1	
Y		Y11 axis	direction terminal	Y no terminal	
Y) axi	is-Common-Delay	ved time of pulse direction (ms)	10	
Y) axi	is-Common-Gear	clearance positive compensation	0	~
		Read Fr	rom PLC Write To PLC OK	Cancel	

Click "config" can configure 10 channels (Y0~Y11) system parameters. Click each parameter to set the value:

PLC1 - Pulse Set		×	
Config - Delete init axis config guide			
Param	Value	^	
YO axis-Common-Parameters setting-Pulse direction logic	positive logic		
YO axis-Common-Parameters setting-enable soft limit	disable		
YO axis-Common-Parameters setting-mechanical back to	negative		
YO axis-Common-Parameters setting-Pulse unit pulse number			
YO axis-Common-Parameters setting-Interpolation coor Cross coordi			
YO axis-Common-pulse send mode	complete 🔹		
YO axis-Common-Pulse num (1)	complete continue		
YO axis-Common-Offset (1)	1		
YO axis-Common-Pulse direction terminal	Y no terminal		
YO axis-Common-Delayed time of pulse direction (ms)	10		
YO axis-Common-Gear clearance positive compensation	0	~	
Read From PLC Write To PLC OK	Cancel		

Some instructions do not have panel configuration mode, when user needs to set the system parameters, please click the left side of software, and click "pulse" to set the parameters.



Then click "config" to set the parameters:

	PLC1 - Pulse Set					
	PLC Config	Cor	nfig 🗕 Delete 🛛 i	nit axis 🛛 config guide		
	PLC Serial Port	∽	Y0 axis		Value	<u>^</u>
L	ethemet	Ч	Y1 axis	eters setting-Pulse direction logic	positive logic	
L	ED ED	Y	Y2 axis	eters setting-enable soft limit	disable	- 1
	4GBOX	Y	Y3 axis	eters setting mechanical back to	negative	
l		Ч	Y4 axis	eters setting-Pulse unit	pulse number	
	Pulse	У		eters setting-Interpolation coor	Cross coordi	
		У	Y6 axis	send mode	complete	1.11
		Y	Y7 axis	num (1)	1	
		Y		t (1)	1	
		У	Y11 axis	direction terminal	Y no terminal	
		YO ax	is-Common-Delay	red time of pulse direction (ms)	10	
		YO ax	is-Common-Gear	clearance positive compensation	0	
	Read From PLC Write To PLC OK Cancel]

Note:

For the same pulse output terminal, the system parameters are shared. For example, if set the system parameters is K1, all the pulse instructions for Y0 will use system parameter group 1.

The following table shows the 4 groups of system parameter of first channel (Y0), each group of parameter can set different pulse default speed, pulse default speed acceleration and deceleration time, gear clearance acceleration/deceleration time, max speed limit, start speed and end speed... (please see below details).

Take first channel (Y0) as an example, other terminal system parameters please refer to appendix 3.

Address	Parameter	Explanation	Туре	Output terminal
SFD900	Pulse parameters	Bit1: pulse direction logic 0: positive logic, 1: negative logic, default is 0 Bit2: soft position limit 0: OFF 1: ON, default is 0 Bit3: machine back to origin direction 0: negative direction 1: positive direction, default is 0 Bit10~ Bit8: pulse unit Bit8: 0: pulse numbers, 1: equivalent 000: pulse numbers 001: micron 011: centimillimeter 101: decimillimeter 111: millimeter Default is 000 Bit15: interpolation coordinate mode 0: cross coordinate, 1: polar coordinate Default is 0	Common parameter	
SFD901	Pulse output mode	Bit0: pulse output mode 0: completion mode, 1: subsequent mode Default is 0		PULSE_1
SFD902	Pulse number/1 rotate low 16-bit			
SFD903	Pulse number/1 rotate high 16-bit			
SFD904	Movement amount/1 rotate low 16-bit			
SFD905	Movement amount/1 rotate high 16-bit			
SFD906	Pulse direction terminal	The number of terminal Y, 0xFF is no terminal		
SFD907	Direction delay time	Default is 20, unit: ms		
SFD908	Gear clearance positive compensation			
SFD909	Gear clearance negative compensation			

SFD910	Electric origin low		
	16-bit		
SFD911	Electric origin high		
	16-bit		
		Bit0: origin signal ON/OFF state	
		Bit1: Z phase ON/OFF state	
	Signal terminal	Bit2: positive limit ON/OFF state	
SFD912	state setting	Bit3: negative limit ON/OFF state	
		0: normally ON(positive logic), 1:	
		normally close(negative logic), default is	
	7 nhago tommin-1	0 Dit0 Dit7: V terminal number 0vEE is	
SFD914	Z phase terminal	Bit0~Bit7: X terminal number, 0xFF is no terminal	
	setting		
	Limit terminal	Bit7~Bit0: positive limit X terminal number, 0xFF is no terminal	
SFD915	setting	Bit15~Bit8: negative limit X terminal	
	Sound	number, 0xFF is no terminal	
	Zero clear CLR		
SFD917	signal output	Bit0~Bit7: Y terminal number, 0xFF is	
~~ ~ / 1 /	terminal setting	no terminal	
	Return speed VH		
SFD918	low 16-bit		
	Return speed VH		
SFD919	high 16-bit		
CED000	Crawling speed VC		
SFD922	low 16-bit		
CED022	Crawling speed VC		
SFD923	high 16-bit		
SED024	Mechanical origin		
SFD924	low 16-bit		
SFD925	Mechanical origin		
51 D723	high 16-bit		
SFD926	Z phase numbers		
SFD927	CLR signal delay	Default is 20, unit: ms	
	time		
SFD928	Wheel radius (polar	Low 16-bit	
SFD929	coordinate)	High 16-bit	
SFD930	Soft limit positive	Low 16-bit	
SFD931	pole value	High 16-bit	
SFD932	Soft limit negative	Low 16-bit	
SFD933	pole value	High 16-bit	

SFD950	Pulse default speed		Gro	
	low 16-bit	It will output pulse with default speed	up1	
SFD951	Pulse default speed high 16-bit	when the speed is 0	Group1 parameter	
SFD952	Pulse default speed		neter	
SFD952	acceleration time		r	
SFD953	Pulse default speed			
51 D 9 5 5	deceleration time			
SFD954	Gear clearance acc/dec time			
		Bit1~Bit0: acc/dec mode		
		00: linear acc/dec		
SFD955	Acceleration	01: S curve acc/dec		
5110955	deceleration mode	10: sine curve acc/dec		
		11: reserved		
		Bit15~ Bit2: reserved		
SFD956	Max speed limit low 16-bit			
SFD957	Max speed limit high 16-bit			
SFD958	Start speed low 16-bit			
SFD959	Start speed high 16-bit			
SFD960	End speed low 16-bit			
SFD961	End speed high 16-bit			
	Follow	1~100, 100 means the time constant is		
SFD962	performance	one tick, 1 means the time constant is		
	parameter	100 ticks.		
	Follow feedforward			
SFD963	compensation			
	parameter	0~100, percentage		
SFD970	Pulse default speed low 16-bit	It will output pulse with default speed	Grou	
SFD971	Pulse default speed high 16-bit	when the speed is 0	Group2 parameter	
SFD972	Pulse default speed acceleration time		neter	
SFD973	Pulse default speed deceleration time			

	1			1
SFD974	Gear clearance			
	acc/dec time			
		Bit1~Bit0: acc/dec mode		
		00: linear acc/dec		
SFD975	Acceleration	01: S curve acc/dec		
512570	deceleration mode	10: sine curve acc/dec		
		11: reserved		
		Bit15~ Bit2: reserved		
SFD976	Max speed limit			
512770	low 16-bit			
SFD977	Max speed limit			
51 D 977	high 16-bit			
SFD978	Start speed low			
51/09/0	16-bit			
SFD979	Start speed high			
51 09/9	16-bit			
SFD980	End speed low			
SFD980	16-bit			
	End speed high			
SFD981	16-bit			
	Follow	1~100, 100 means the time constant is		
SFD982	performance	one tick, 1 means the time constant is		
	parameter	100 ticks.		
	Follow feedforward			
SFD983	compensation			
	parameter	0~100, percentage		
GEDOOO	Pulse default speed		G	
SFD990	low 16-bit	It will output pulse with default speed	rout	
0000001	Pulse default speed	when the speed is 0	53 p	
SFD991	high 16-bit		arar	
	Pulse default speed		Group3 parameter	
SFD992	acceleration time		ï	
	Pulse default speed			
SFD993	deceleration time			
	Gear clearance			
SFD994	acc/dec time			
		Bit1~Bit0: acc/dec mode		
		00: linear acc/dec		
	Acceleration	01: S curve acc/dec		
SFD995	deceleration mode	10: sine curve acc/dec		
		11: reserved		
		Bit15~ Bit2: reserved		
	1		1	

			1	1
SFD996	Max speed limit low 16-bit			
SFD997	Max speed limit high 16-bit			
SFD998	Start speed low 16-bit			
SFD999	Start speed high 16-bit			
SFD1000	End speed low 16-bit			
SFD1001	End speed high 16-bit			
SFD1002	Follow performance parameter	1~100, 100 means the time constant is one tick, 1 means the time constant is 100 ticks.		
SFD1003	Follow feedforward compensation parameter	0~100, percentage		
SFD1010	Pulse default speed low 16-bit	It will output pulse with default speed	Group	
SFD1011	Pulse default speed high 16-bit	when the speed is 0	Group4 parameter	
SFD1012	Pulse default speed acceleration time		neter	
SFD1013	Pulse default speed deceleration time			
SFD1014	Gear clearance acc/dec time			
SFD1015	Acceleration deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~ Bit2: reserved		
SFD1016	Max speed limit low 16-bit			
SFD1017	Max speed limit high 16-bit			
SFD1018	Start speed low 16-bit			
SFD1019	Start speed high 16-bit			

SFD1020	End speed low 16-bit		
SFD1021	End speed high 16-bit		
	Follow	1~100, 100 means the time constant is	
SFD1022	performance	one tick, 1 means the time constant is	
	parameter	100 ticks.	
	Follow feedforward		
SFD1023	compensation		
	parameter	0~100, percentage	
•••			

Common parameter

• Pulse direction logic

Pulse direction includes positive logic(default) and negative logic.

Positive logic: when the pulse numbers are positive value, it will output forward direction pulse (for example, HSD0 value is increasing), pulse direction terminal is ON. when the pulse numbers are negative value, it will output reverse direction pulse(for example, HSD0 value is decreasing), pulse direction terminal is OFF.

Negative logic: when the pulse numbers are positive value, it will output forward direction pulse (for example, HSD0 value is increasing), pulse direction terminal is OFF. when the pulse numbers are negative value, it will output reverse direction pulse(for example, HSD0 value is decreasing), pulse direction terminal is ON.

When the pulse is outputting, the direction terminal is ON, this terminal will not be reset automatically after the pulse output ends. The direction terminal will change the direction according to the pulse settings when pulse sends next time. If the pulse instruction has no direction, it needs to reset the direction terminal in the program.

Note:

1: this parameter default value is positive logic. All the program in this manual is made as positive logic.

2: fit for the instruction PLSR, PLSF, ZRN.

• Enable soft limit

In order to avoid the movement beyond the range of travel, the protection function is added to both ends of the travel. It is used to auto-search the origin signal and protect when backing to mechanical origin. It will judge the value of pulse accumulated register and protect the travel. Note: soft limit and hardware limit can be used at the same time.

The parameter configuration:

Param	Value
YO axis-Common-Parameters setting-Pulse direction logic	positive logic
YO axis-Common-Parameters setting-enable soft limit	disable 🔹
YO axis-Common-Parameters setting-mechanical back to	disable enable
YO axis-Common-Parameters setting-Pulse unit	pulse number

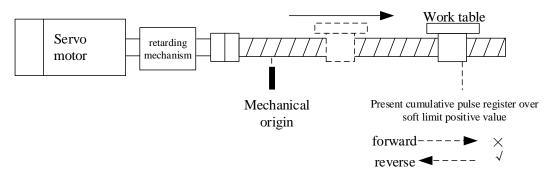
• Soft limit positive value

To prevent the table from moving beyond the range when executing the instruction PLSR, PLSF, DRVA, DRVI, interpolation instructions, it will add the value of present accumulated pulse register at the positive side of travel to protect the machine.

The configuration:

YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0
YO axis-group 1-Pulse default speed	0

If the forward sending pulse reaches soft limit positive value for instruction PLSR, PLSF, DRVA, DRVI, interpolation instruction, the pulse will slow stop. If the present cumulative pulse register value is over soft limit positive value, the forward pulse will always be prohibitted, but the reverse pulse can be triggered.



Note:

1: the parameter value cannot over max positive travel.

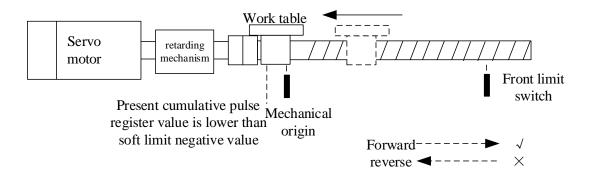
2: fit for PLSR, PLSF, DRVA, DRVI and interpolation instruction.

• Soft limit negative value

To prevent the table from moving beyond the range when executing the instruction PLSR, PLSF, DRVA, DRVI, interpolation instructions, it will add the value of present accumulated pulse register at the negative side of travel to protect the machine. The configuration:

YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0
YO axis-group 1-Pulse default speed	0

If the forward sending pulse reaches soft limit negative value for instruction PLSR, PLSF, DRVA, DRVI, interpolation instruction, the pulse will slow stop. If the present cumulative pulse register value is lower than soft limit negative value, the reverse pulse will always be prohibitted, but the forward pulse can be triggered.



Note:

1: the parameter value cannot below min negative travel.

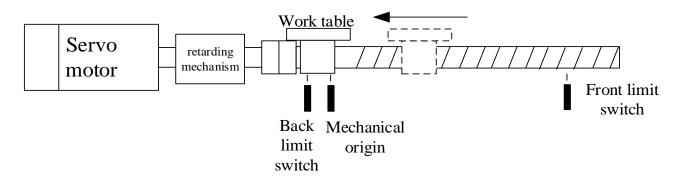
2: fit for PLSR, PLSF, DRVA, DRVI and interpolation instruction.

• Mechanical back to origin default direction

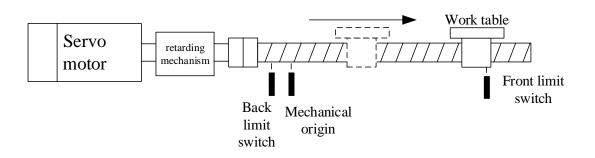
The work table default movement direction when the mechanical back to origin instruction ZRN is executed. The configuration:

٧O	axis-Common-Parameters setting-enable soft limit	disable
YO	axis-Common-Parameters setting-mechanical back to the	negative
YO	axis-Common-Parameters setting-Pulse unit	pulse number
YO	axis-Common-Parameters setting-Interpolation coordina	Cross coordi

Negative: the work table will move in reverse direction when executing ZRN.



Positive: the work table will move in forward direction when executing ZRN.



• Pulse unit

The pulse unit include pulse number(default) and equivalent (1um, 0.01mm, 0.1mm, 1mm optional).

axis-Common-Parameters setting-mechanical back to the	negative
axis-Common-Parameters setting-Pulse unit	pulse number 🔹
axis-Common-Parameters setting-Interpolation coordina	pulse number 1um
axis-Common-pulse send mode	0.01mm
axis-Common-Pulse num (1)	0.1mm 1mm

pulse number: if the pulse unit is pulse number, all the pulse frequency and number in the configuration table are calculated by pulse number. for example:

		frequence	pulse count	wait condition	wait register	jump register
	1	1000	2000	pulse sending complete	KO	KO
	2	2000	4000	pulse sending complete	KO	KO
•	3	3000	6000	pulse sending complete	KO	KO

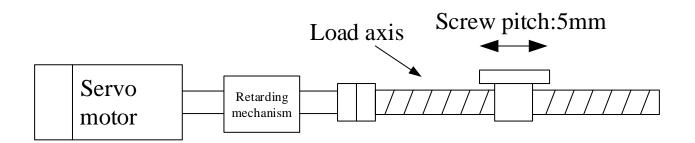
There are three segments in the configuration table, segment 1 will send 2000 pulses at the speed 1000Hz, segment 2 will send 4000 pulses at the speed 2000Hz, segment 3 will send 6000 pulses at the speed 3000Hz.

Equivalent: 1um, 0.01mm, 0.1mm, 1mm optional. All the pulse frequency and equivalent in the configuration table are calculated by length unit. Before explaining the equivalent, we will introduce pulse number (1 rotate) and offset(1 rotate) first.

• Pulse number (1 rotate)

The pulse number that the transmission mechanism rotates 1 circle. As there is retarding mechanism, the motor rotates one circle does not mean the transmission mechanism rotates one circle.

For example: one servo motor drives lead screw through retarding mechanism, the servo drive model is DS2-20P7-AS, servo motor model is MS-80ST-M02430B-20P7(encoder 2500 ppr), the servo drive electronic gear ratio is 1:1, reduction ratio of retarding mechanism is 1:5, the pitch of the ball screw is 5mm.



The pulse number of ball screw rotating one circle:

$$50000 = 2500 * 4 * \frac{5}{1}$$

• Offset(1 rotate)

The movement quantity of transmission mechanism rotates 1 circle. For example, in the above application, the offset is the ball screw pitch 5mm. If the object is synchronous belt, the offset is the synchronous belt transmission mechanism shaft perimeter.

After knowing the pulse number and offset, next we will understand how to set the equivalent. We will send three segments of pulse through the above mechanical structure.

		frequence	pulse count	wait condition	wait register	jump register
	1	10	20	pulse sending complete	KO	KO
	2	15	30	pulse sending complete	KO	KO
•	3	20	40	pulse sending complete	KO	KO

It configured three segments in above table. The pulse unit is equivalent. Segment 1 will move 20mm at the speed 10mm/s, segment 2 will move 30mm at the speed of 15mm/s, segment 3 will move 40mm at the speed of 20mm/s. The common parameters are configured as the below table:

axis-Common-Parameters setting-Pulse unit	1mm	
axis-Common-Parameters setting-Interpolation coordina	Cross c	oordi
axis-Common-pulse send mode	complet	e
axis-Common-Pulse num (1)	50000	
axis-Common-1mm(revolve)	5	

transform the equivalent to related pulse frequency and pulse number, please see below table:

No.	Pulse unit	Frequency/speed	Pulse number/length
1	equivalent	10mm/s	20mm
1	Pulse number	100000pulse/s	200000 pulse
2	equivalent	15mm/s	30mm
2	Pulse number	150000pulse/s	300000 pulse
2	equivalent	20mm/s	40mm
3	Pulse number	200000pulse/s	400000 pulse

Note:

 when the pulse unit is pulse number, Y0 axis cumulative pulse register HSD0 (double word) is pulse numbers. When the pulse unit is equivalent, Y0 axis cumulative pulse register HSD0 (double word) is pulse numbers. Register HSD2(double word) is cumulative equivalent length.
 when the pulse unit is equivalent, all the parameters will execute as equivalent, the length unit will transform to the equivalent unit, for example 1mm, then all the unit will transform as 1mm. and the unit of offset(1 rotate) should be same to pulse unit setting, for example, pulse unit is 0.1mm, offset is 6, which means the offset of one rotate is 6*0.1mm=0.6mm, and other unit related to length and speed will be 0.1mm or 0.1mm/s.

3: please note the max output frequency cannot over 200Khz when the pulse unit is equivalent. 4: fit for instruction PLSR, PLSF, ZRN.

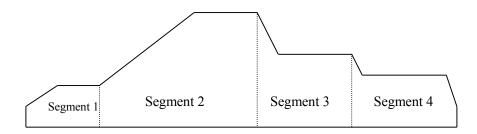
• Interpolation coordinate mode

This parameter is not valid for now, no need to modify.

• Pulse send mode

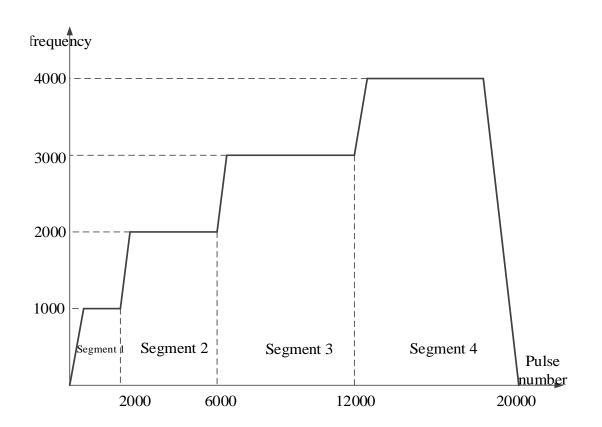
It includes complete mode and continue mode.

Complete mode: it starts next segment of pulse when present segment pulse finishes.

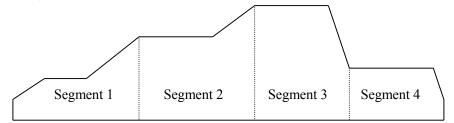


The pulse curve please refer to above diagram. Each segment will send the pulse numbers at setting speed. Except the last segment, each segment includes rising or falling part, stable part. The last segment includes rising part, falling part and stable part.

For example: the PLC needs to send four segments of pulse, segment 1 frequency is 1000Hz, pulse number is 2000, segment 2 frequency is 2000Hz, pulse number is 4000, segment 3 frequency is 3000Hz, pulse number is 6000, segment 4 frequency is 4000Hz, pulse number is 8000. It will send the pulse as complete mode, the curve please see below diagram.

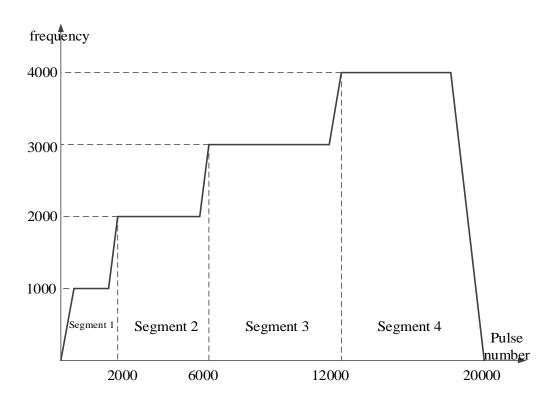


Continue mode: it already accelerates or decelerates to next segment when present segment pulse finishes sending.



The pulse curve diagram is as the above. When the present segment finishes sending, it already switch to next segment speed. Except segment 1, each segment includes stable part, rising part or falling part. Segment 1 includes rising part or falling part, stable part, rising or falling part.

For example: the PLC needs to send four segments of pulse, segment 1 frequency is 1000Hz, pulse number is 2000, segment 2 frequency is 2000Hz, pulse number is 4000, segment 3 frequency is 3000Hz, pulse number is 6000, segment 4 frequency is 4000Hz, pulse number is 8000. It will send the pulse as continue mode, the curve please see below diagram.



Note: the two modes are fit for instruction PLSR and PLSF.

• Pulse direction terminal

The pulse direction of PLSR needs to configure in the parameter table:

YO axis-Common-Offset (1)	1
YO axis-Common-Pulse direction terminal	¥ no terminal
YO axis-Common-Delayed time of pulse direction (ms)	10

XD2, XD3, XD5 (except XD5-48T6/60T6) and XDC series transistor output PLC all have two channels of pulse output (Y0, Y1), the direction terminal can be any terminal except Y0 and Y1. XD5-48T6/60T6 has 6 channels of pulse output (Y0, Y1, Y2, Y3, Y4, Y5). XDM series has 4 channels or 10 channels pulse output (Y0, Y1, Y2, Y3 or Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y10, Y11). The direction terminal can be any terminal except pulse output terminal.

The pulse output terminal uses high-speed optocoupler(response time below 5us), other terminals use normal optocoupler(response time below 0.2ms).

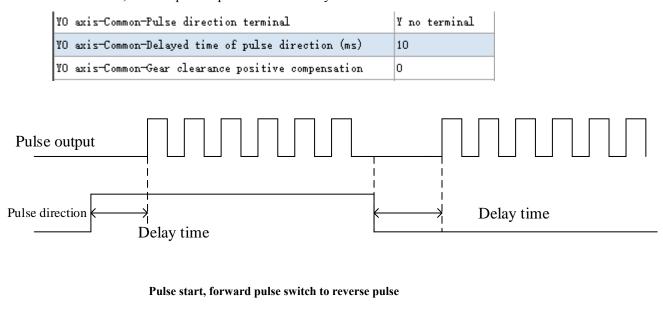
When Y0 is used to pulse output, and other pulse output terminals no need to output pulse, these terminals also can be pulse direction terminal. If Y0 no needs to output pulse, it also can be pulse direction terminal.

Note:

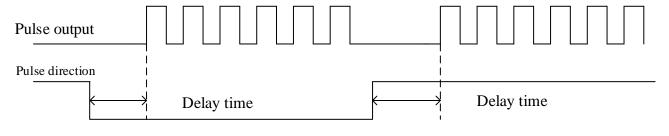
1: please do not choose the terminal over the actual output terminal number. 2: fit for PLSR, PLSF, ZRN.

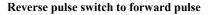
• Delayed time of pulse direction

When it is sending forward direction pulse, it will set ON the direction terminal first, then output



the pulse after the delay time. When it is sending reverse direction pulse, it will set OFF the direction terminal first, then output the pulse after the delay time.





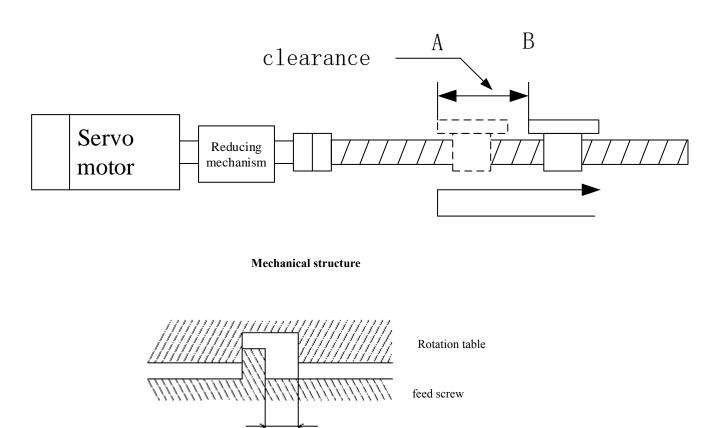
As the pulse output terminal is high-speed optocoupler(response time below 5us), other terminals are normal optocoupler(response time below 0.2ms)(such as XD3-32T-E) or relay output(about 10ms)(such as XD3-24R-E), the direction terminal will output after pulse terminal, so the direction terminal must be triggered first, then delay some time to output pulse. This can avoid the pulse error caused by direction switch lag(forward pulse switch to reverse pulse or reverse pulse switch to forward pulse).

The default pulse direction delay time is 10ms, user can adjust the time according to the terminal output type and scanning period(Y0 and Y1 response time is 5us, other transistor terminal is 0.2ms, relay output is 10ms).

Note: suitable for PLSR, PLSF, ZRN.

• Gear clearance positive compensation

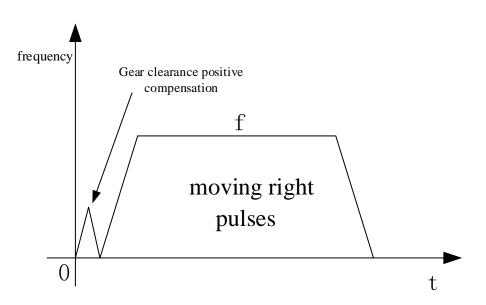
When the work table finished reverse moving and switched to forward moving, there is clearance between table and ball screw, it will cause the actual moving distance is less than setting value, this parameter can delete this error.



Return difference (gap, loose clearance)

Mechanical clearance structure

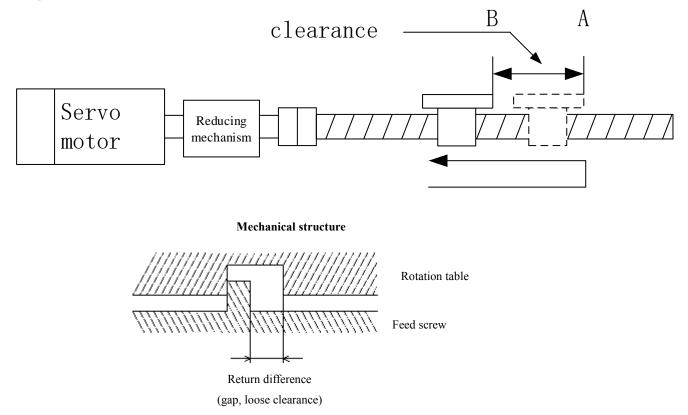
The table moves from right to left, when the table left side moves to position A, it will stop and moves from left to right. As the ball screw clearance, it cannot move right for some pulses, and the actual moving distance is less than setting value. If there is no clearance, it will move from A to B. in order to delete the error, we must send some pulses before moving right, and then send the actual moving right pulses.



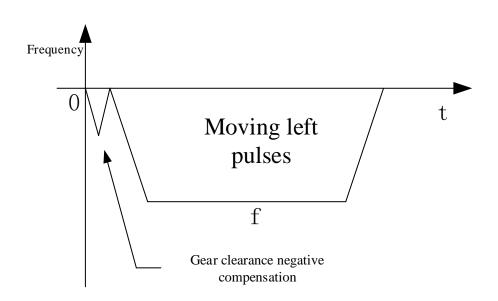
Note:

- %1: it only execute the gear clearance positive compensation when the direction of last and present pulse segment is different.
- *2: the gear clearance positive compensation pulses should output in separate segment, it cannot output in the same pulse segment of moving right pulses.
- ※3: the gear clearance positive compensation pulses will not be counted in pulse cumulative registers (such as HSD0 for Y0 output terminal).
- **4: suitable for instruction PLSR, PLSF, ZRN.
- %5: the unit of gear clearance positive compensation is decided by pulse unit.
 - Gear clearance negative compensation

When the work table finished forward moving and switched to reverse moving, there is clearance between table and ball screw, it will cause the actual moving distance is less than setting value, this parameter can delete this error.



The table moves from left to right, when the table right side moves to position A, it will stop and moves from right to left. As the ball screw clearance, it cannot move left for some pulses, and the actual moving distance is less than setting value. If there is no clearance, it will move from A to B. in order to delete the error, we must send some pulses before moving left, and then send the actual moving left pulses.



Note:

- %1: it only execute the gear clearance negative compensation when the direction of last and present pulse segment is different.
- *2: the gear clearance negative compensation pulses should output in separate segment, it cannot output in the same pulse segment of moving left pulses.
- ※3: the gear clearance negative compensation pulses will not be counted in pulse cumulative registers (such as HSD0 for Y0 output terminal).
- **4: suitable for instruction PLSR, PLSF, ZRN.
- %5: the unit of gear clearance negative compensation is decided by pulse unit.
 - Electrical origin position

This parameter cannot modify.

• Signal terminal switch state-point switch state setting

It can set the state of the signal collection terminal. The terminal state can be normally open and normally close. The signal terminal includes origin point, Z phase switch, positive limit switch, negative limit switch.

Config 👻 Delete 🛛 init axis 🔷 config guide		
Param	Value	^
YO axis-Common-Delayed time of pulse direction (ms)	10	
YO axis-Common-Gear clearance positive compensation	0	
YO axis-Common-Gear clearance negative compensation	0	
YO axis-Common-Electrical origin position	0	
YO axis-Common-signal terminal switch state setting-Far-point	normally	
YO axis-Common-signal terminal switch state setting-Z phase s	normally	
YO axis-Common-signal terminal switch state setting-positive	normally	
YO axis-Common-signal terminal switch state setting-negative	normally	
YO axis-Common-Far-point signal terminal setting	X no term	
YO axis-Common-Z phase terminal setting	X no term	
		~

Take origin point as an example.

Normally open: the mechanical origin switch is normally open(OFF) when it returns origin, it will be ON when the machine touches the origin switch.

Normally close: the mechanical origin switch is normally close(ON) when it returns origin, it will be OFF when the machine touches the origin switch.

• Origin point signal terminal setting

The PLC input point of mechanical origin switch.

YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal

Note:

- [⊗]1: the input point range cannot over actual input of PLC.
- *2: only fit for mechanical return origin instruction ZRN.
- ※3: the origin point can be PLC input terminal, if the terminal is for external interruption input, the returning mechanical origin process will be operated as interruption and the precision will be improved (Z phase return origin has no effect). If the terminal is not for external interruption, the returning origin process will be affected by PLC scanning period (Z phase return origin has no effect).
- %4: please refer to appendix 4 for details of external interruption terminal.
 - Z phase terminal setting

When returning mechanical origin, it will move reverse slowly with slow speed and acceleration

slop until reach origin creep speed, and it starts to count the Z phase signal at the moment of leaving the origin signal. Here can set the Z phase count input terminal.

YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal
YO axis-Common-negative limit terminal setting	X no terminal

Note:

*1: only fit for mechanical return origin instruction ZRN.

*2: Z phase terminal only can be PLC external interruption input. As the pulse width of Z phase signal outputting from servo drive is very narrow, normal PLC input filter time is 10ms, the Z phase signal only can be catched through high speed optical coupler input. If using normal terminal, it cannot catch the Z phase signal and cause returning mechanical origin error.

PLC model	Z phase terminal setting
XD2-16/24/32/48/60	X2, X3, X4, X5, X6, X7
XD3-16/24/32/48/60	X2, X3, X4, X5, X6, X7
XD5-16	X2, X3, X4, X5, X6, X7
XD5-24/32/24T4/32T4/48T4/48D4T4/60T4	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XD5-48/60/48T6/60T6/60T10	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XDM-24T4/32T4	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XDM-60T4/60T4L/60T10	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XDC-24/32/48/60	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XD5E-24/30/48/60/30T4/60T4/60T6/60T10	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XDME-30T4/60T4/60T10	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XDH-60T4	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XL3-16	X2, X3, X4, X5, X6, X7
XL3-32	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XL5-16	X2, X3, X4, X5, X6, X7
XL5-32/32T4	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XL5E-16	X2, X3, X4, X5, X6, X7
XL5E-32T/32T4	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XL5E-64T6	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13
XLME-32T4	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13

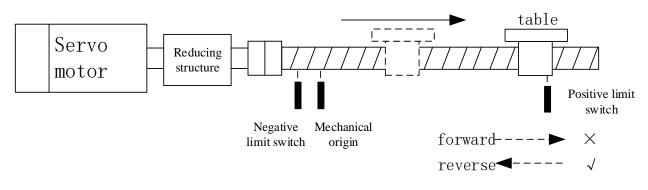
X3: Z phase input terminals:

• Positive limit terminal setting

When the machine is returning origin (instruction ZRN), to prevent the table from moving beyond the range, the protection terminal is installed at both ends of the range. Please refer to ZRN instruction for details.

YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal
YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal

When the instruction ZRN, PLSR, PLSF are executed, if the forward pulse touches positive limit, the pulse will stop in slow stop mode (make sure the positive limit switch is in triggered state after pulse stop). The pulse will be always prohibitted when the positive limit switch is triggered, but the reverse pulse can be triggered.



Notes:

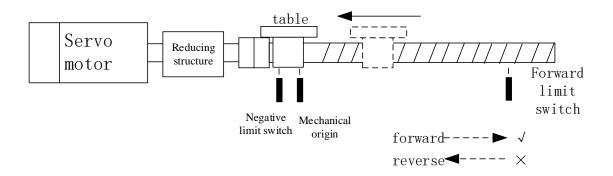
- %1: the input terminal cannot over the PLC actual input range.
- *2: make sure the positive limit block is long enough, to ensure the positive limit switch is still triggered after pulse stop. Otherwise the table will strick the machine when the forward pulse is triggered again.
- 3: fit for instruction PLSR, PLSF, ZRN.

• Negative limit terminal setting

When the machine is returning origin (instruction ZRN), to prevent the table from moving beyond the range, the protection terminal is installed at both ends of the range. Please refer to ZRN instruction for details.

YO axis-Common-positive limit terminal setting	X no terminal
YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0

When the instruction ZRN, PLSR, PLSF are executed, if the reverse pulse touches negative limit, the pulse will stop in slow stop mode (make sure the negative limit switch is in triggered state after pulse stop). The pulse will be always prohibitted when the negative limit switch is triggered, but the forward pulse can be triggered.



Notes:

- ×1: the input terminal cannot over the PLC actual input range.
- *2: make sure the negative limit block is long enough, to ensure the negative limit switch is still triggered after pulse stop. Otherwise the table will strick the machine when the reverse pulse is triggered again.
- 3: fit for instruction PLSR, PLSF, ZRN.
 - Zero clear CLR output setting

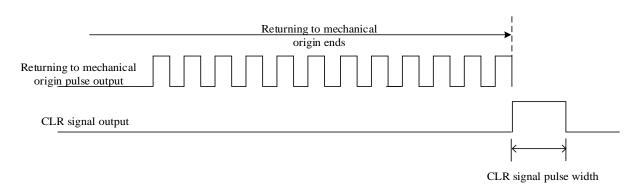
It will output the signal after the returning mechanical origin ends. This signal can send to other device such as servo drive to clear the servo motor error counter, then copy the mechanical origin position to present position to finish the returning to zero process.

YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0

• CLR signal delayed time

The CLR signal pulse width time, the unit is ms. The range is 0 to 32767 (default is 20ms).

YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0



CLR signal diagram

Notes:

 \times 1: only fit for instruction ZRN.

- *2: please use PLC main unit output terminal for CLR signal output.
- ※3: please do not set too small CLR signal delay time, otherwise the servo drive cannot receive too narrow pulse width signal.

• Return speed VH

When it starts to run ZRN, the table accelerates to return speed VH and moves towards mechanical origin, this can shorten the returning time.

YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0

Notes:

※1: only fit for instruction ZRN.

- *2: when the ZRN starts, VH accelerates as setting acceleration slop, then decelerates as setting deceleration slop when touching the near origin signal or origin signal.
- ※3: if there is no near origin signal, please do not set the VH speed too large, otherwise it will cause mechanical oscillation as the VH speed quickly decelerating to zero.
- ※4: if there is no near origin signal, please do not set the VH speed too large and deceleration slop too small, otherwise it will cause the table out of origin signal and even touching the reverse limit signal when decelerating to zero as the table decelerating time is too long.
 - Creeping speed VC

When it meets the origin signal, the start speed decelerates to zero, after delay time, it reverse accelerates to creeping speed. It will stop the creeping speed at once when the work table leaves origin signal. As the stop position of work table leaving origin signal is mechanical origin, in order to improve mechanical origin precision, generally, the creeping speed is small.

YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0

Note:

- **%**1: only fit for instruction ZRN.
- *2: the creeping speed acc/dec slope is same to setting acceleration/deceleration slope. It will urgent stop or count the Z phase pulse numbers when leaving origin signal.
- ※3: Do not set the creeping speed over 100r/min, otherwise it will affect the high precision returning to origin.
- %4: Do not set the creeping speed larger than or equal to returning to origin speed VH.
 - Mechanical zero position

The present position after returning to mechanical origin ends. Take axis Y0 as an example, set the present position value HSD0(double word) or HSD2(double word) after returning to mechanical

origin.

Generally, the present value of mechanical origin is 0, it also can be set to other value. After the returning to mechanical origin, the related cumulative pulse register will be updated to setting value.

YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0

Note:

※1: only fit for instruction ZRN.

- 2: if the pulse unit of axis Y0 is set to pulse numbers, the mechanical origin setting value will be written in HSD0(double word) after returning to mechanical origin. If the pulse unit of axis Y0 is set to equivalent (1mm, 0.1mm, 0.01mm, 1um), the mechanical origin setting value will be written in HSD2(double word) after returning to mechanical origin.
 - Z phase numbers

When it meets the origin signal, the start speed decelerates to zero, after delay time, it reverse accelerates to creeping speed. It can count the servo motor Z phase pulse when the work table leaves origin signal. It will stop creeping speed at once when the count value reaches setting Z phase pulse numbers, and mechanical returning to origin ends.

YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20

Note:

- \times 1: only fit for instruction ZRN.
- *2: if the Z phase numbers is set to 0, it means Z phase pulse catching function is invalid, it will stop at once when leaving origin with creeping speed and returning to origin ends.
- ※3: please avoid the interval between work table leaving origin signal and Z phase signal is too short, otherwise the origin position will be error.
- %4: Z phase signal maybe changed after install the servo motor again, please adjust it.
- *5: if it is stepper motor, the external proximity switch signal can be used to Z phase signal.
 - Grinding wheel radius(polar)

This parameter cannot be used right now.

YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0

Group 1 parameters (group 2 to 4 parameters please refer to group 1)

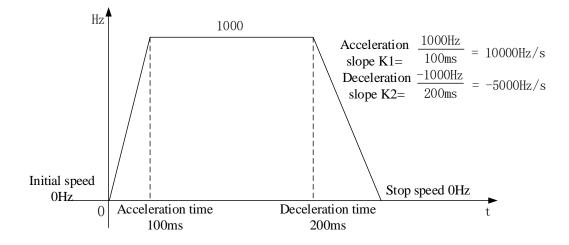
• Pulse default speed/acceleration time of default pulse speed/deceleration time of default pulse speed(ms)

The three parameters and initial speed, stop speed are used to define the pulse acceleration and deceleration slop. The pulse default speed unit is decided by pulse unit parameter.

VO axis-group 1-Pulse default speed	0
YO axis-group 1-Acceleration time of Pulse default s	0
YO axis-group 1-Deceleration time of pulse default s	0

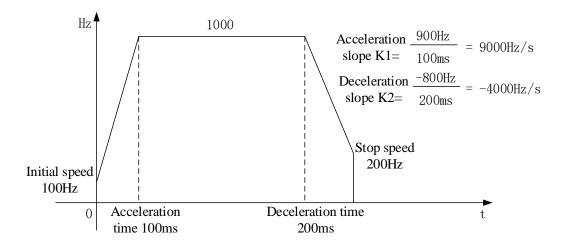
Example 1:

When the pulse unit is pulse numbers, pulse default speed is 1000Hz, acceleration time of pulse default speed is 100ms, deceleration time of pulse default speed is 200ms, initial speed is 0Hz, stop speed is 0Hz, it means the pulse frequency takes 100ms to increase 1000Hz and takes 200ms to decrease 1000Hz. If it accelerates from 0Hz to 5000Hz, the time is 5000/1000*100=500ms, if it decelerates from 5000Hz to 0Hz, the time is 5000/1000*200=1000ms.



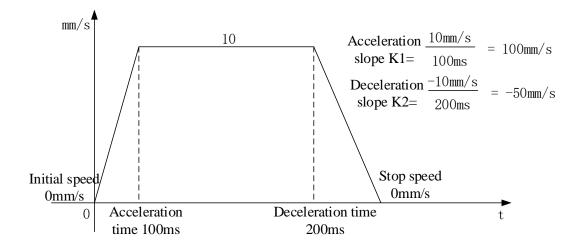
Example 2:

When the pulse unit is pulse numbers, pulse default speed is 1000Hz, acceleration time of pulse default speed is 100ms, deceleration time of pulse default speed is 200ms, initial speed is 100Hz, stop speed is 200Hz, it means the pulse frequency takes 100ms to increase (1000-100)=900Hz and takes 200ms to decrease (1000-200)=800Hz. If it accelerates from 0Hz to 5000Hz, the time is 5000/900*100=555ms, if it decelerates from 5000Hz to 0Hz, the time is 5000/800*200=1250ms.



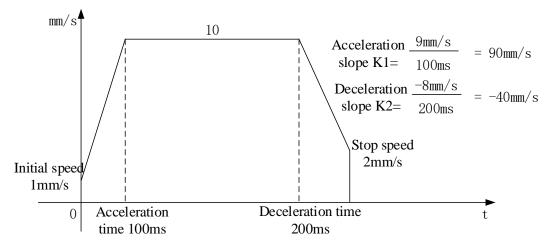
Example 3:

When the pulse unit is equivalent 1mm, pulse default speed is 10mm/s, acceleration time of pulse default speed is 100ms, deceleration time of pulse default speed is 200ms, initial speed is 0mm/s, stop speed is 0mm/s, it means the pulse frequency takes 100ms to increase 10mm/s and takes 200ms to decrease 10mm/s. If it accelerates from 0 to 50mm/s, the time is 50/10*100=500ms, if it decelerates from 50mm/s to 0, the time is 50/10*200=1000ms.



Example 4:

When the pulse unit is equivalent 1mm, pulse default speed is 10mm/s, acceleration time of pulse default speed is 100ms, deceleration time of pulse default speed is 200ms, initial speed is 1mm/s, stop speed is 2mm/s, it means the pulse frequency takes 100ms to increase (10-1)=9mm/s and takes 200ms to decrease (10-2)=8mm/s. If it accelerates from 0 to 50mm/s, the time is 50/9*100=555ms, if it decelerates from 50mm/s to 0, the time is 50/8*200=1250ms.



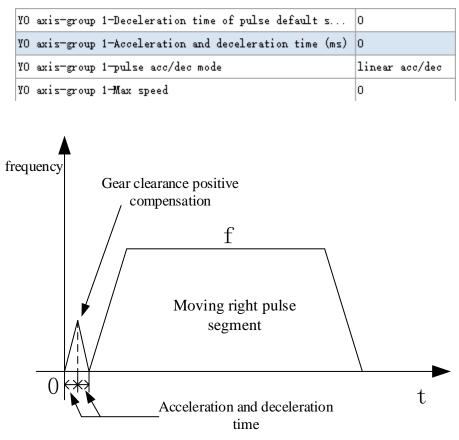
Note:

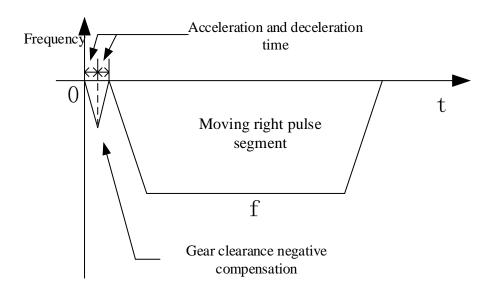
- %1: the three parameters and initial speed, stop speed are used to define the acceleration and deceleration slope.
- *2: the pulse acceleration slope is determined by the time accelerating from initial speed to

default pulse speed, the pulse deceleration slope is determined by the time decelerating from default pulse speed to stop speed.

- X3: the parameter is fit for instruction PLSR, PLSF, DRVI, DRVA, ZRN.
- %4: initial speed and stop speed must be less than rated speed.
- %5: the pulse default speed is not related to the pulse frequency, it is only used to set the acceleration and deceleration slope. But when the pulse frequency is 0, it will output pulse as the default pulse speed.
 - Acceleration and deceleration time (ms)

This time is for gear clearance positive and negative compensation. This acceleration and deceleration time is same whatever how many is the gear clearance compensation quantity, the unit is ms.





Note:

 \approx 2: the acceleration and deceleration time is fixed value whatever how many is the gear clearance compensation.

*3: this parameter is fit for instruction PLSR, PLSF, DRVI, DRVA, ZRN.

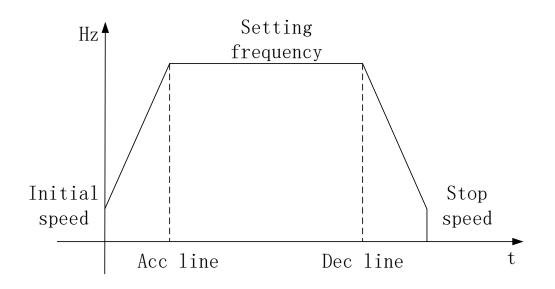
• Pulse acc/dec mode

The pulse acceleration mode accelerating from initial speed to setting frequency and pulse deceleration mode decelerating from setting frequency to initial speed.

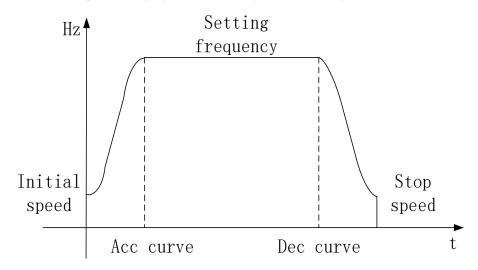
YO axis-group 1-Deceleration time of pulse default s	0
YO axis-group 1-Acceleration and deceleration time (ms)	0
YO axis-group 1-pulse acc/dec mode	linear acc/dec
YO axis-group 1-Max speed	0
YO axis-group 1-Initial speed	0

The pulse acc/dec mode include linear mode, S curve mode and sine curve mode.

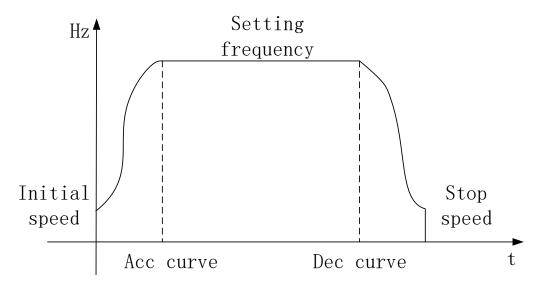
Linear mode: the speed changing for accelerating or decelerating is line.



S-curve mode: the speed changing for accelerating or decelerating is S-curve.



Sine curve mode: the speed changing for accelerating or decelerating is sine curve.



Sine-curve mode is fit for the receiving of stepper motor and servo motor and improve the run performance of stepper motor and servo motor. The details please refer to S-curve acceleration and deceleration.

Note: this parameter is fit for the instruction PLSR, PLSF, ZRN.

• Max speed

When all the pulse instructions in the program is executing parameter group 1, the highest pulse frequency cannot over the max speed, if it is over the max speed, PLC will run as the max speed.

YO axis-group 1-Acceleration and deceleration time (ms)	0
YO axis-group 1-pulse acc/dec mode	linear acc/dec
YO axis-group 1-Max speed	0
YO axis-group 1-Initial speed	0
YO axis-group 1-stop speed	0

Note:

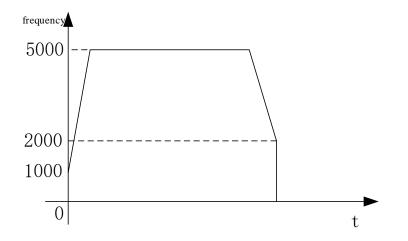
- %1: the max speed unit is changing as pulse unit(pulse number or equivalent).
- *2: XD all series PLC pulse output frequency max speed is 200Khz. The max speed cannot over this value.
- ※3: when the pulse unit is equivalent, the transformed pulse frequency maybe very large and over max speed, please pay attention.
- %4: User must set the max speed when using pulse instruction, otherwise the pusle cannot output normally.
- *5: this parameter is fit for instruction PLSR, PLSF, ZRN.
 - Initial speed and stop speed

The pulse start frequency and end frequency for the pulse instruction start and completion. Generally, the initial and stop speed is 0, but for some special occasions, the pulse needs to start with non-zero speed and complete with non-zero speed.

YO axis-group 1-pulse acc/dec mode	linear acc/dec
YO axis-group 1-Max speed	0
YO axis-group 1-Initial speed	0
YO axis-group 1-stop speed	0
YO axis-group 1-FOLLOW performance param(1-100)	50

For example, it needs to output 30000 pulses, and accelerates from 1000Hz, takes 100ms to reach 5000Hz. And it decelerates from 5000Hz, takes 50ms to reach 2000Hz, and the pulse will complete here. The configuration is shown as below:

YO axis-group 1-Max speed	200000
YO axis-group 1-Initial speed	1000
YO axis-group 1-stop speed	2000



Note:

- *1: the pulse unit of initial speed and stop speed is changing as the pulse number or equivalent.
- 2: the initial speed and stop speed must be less than the max speed.
- ※3: when the pulse unit is equivalent, the transformed pulse frequency maybe very large and over max speed, please pay attention.
- *4: make sure to set the initial speed and stop speed for pulse instruction, the default value is 0.
- *5: this parameter is fit for instruction PLSR, PLSF, ZRN.
 - Follow parameters

The FOLLOW instruction can make the slave axis servo motor or stepper motor following the master axis motor motion (which means the slave axis motion is consistant with main axis). The parameters include FOLLOW performance and FOLLOW feedforward compensation.

The FOLLOW instruction is motion following function, it can control the servo or stepper motor by outputting pulse according to motor encoder feedback.

FOLLOW performance: the function is similar to serve drive rigidity function. The smaller the value, the smaller the follow rigidity (delay time is long), the larger the value, the larger the follow rigidity (delay time is short).

FOLLOW feedforward compensation: there is delay time from receiving pulse to outputting pulse. In order to reduce the delay time, it can set the feedforward compensation, make the pulse a little advanced. But if the feedforward parameter is too large, it will enter infinite loop, the motor will vibrate when the follow process ends.

YO axis-group 1-stop speed	2000
YO axis-group 1-FOLLOW performance param(1-100)	50
YO axis-group 1-FOLLOW forward compensation(0-100)	0
YO axis-group 2-Pulse default speed	0
YO axis-group 2-Pulse default speed	0

1-2-1-4. Pulse interruption flag

Pulse instruction PLSR can set up to 100 segments of pulse. It can produce a interruption flag after each pulse segment completion.

Note: each pulse segment has only one related interruption flag, whatever how is the pulse

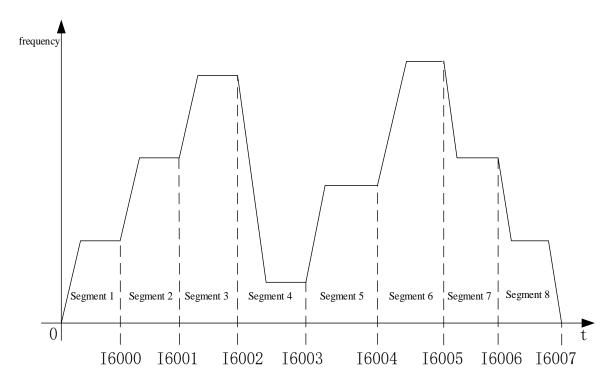
configuration jump setting, the interruption flag will be executed when this pulse segment is running.

Interruption flag	Pulse axis	Notes
I60**(I6000~I6099)	PLS+0 (pulse)	Y0 axis 100 pulse segments interruption
I61**(I1000~I6199)	PLS+1 (pulse)	Y1 axis 100 pulse segments interruption
I62**(I6200~I6299)	PLS+2 (pulse)	Y2 axis 100 pulse segments interruption
I63**(I6300~I6399)	PLS+3 (pulse)	Y3 axis 100 pulse segments interruption
I64**(I6400~I6499)	PLS+4 (pulse)	Y4 axis 100 pulse segments interruption
I65**(I6500~I6599)	PLS+5 (pulse)	Y5 axis 100 pulse segments interruption
I66**(I6600~I6699)	PLS+6 (pulse)	Y6 axis 100 pulse segments interruption
I67**(I6700~I6799)	PLS+7 (pulse)	Y7 axis 100 pulse segments interruption
I68**(I6800~I6899)	PLS+8 (pulse)	Y8 axis 100 pulse segments interruption
I69**(I6900~I6999)	PLS+9 (pulse)	Y9 axis 100 pulse segments interruption

Interruption flag for each pulse segment:

Example 1:

Now PLC has 8 pulse segments and executes from the first segment, the pulse output terminal is Y0, the interruption is shown as below:

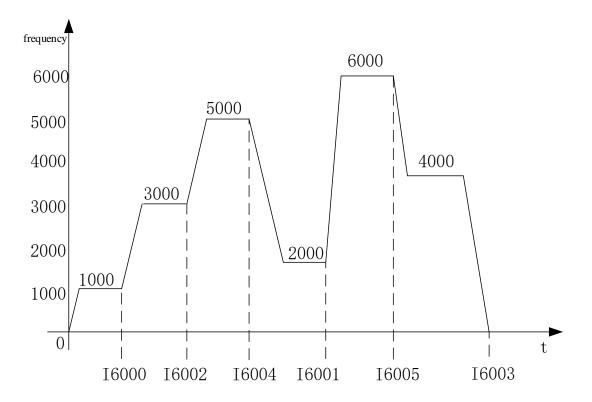


Example 2:

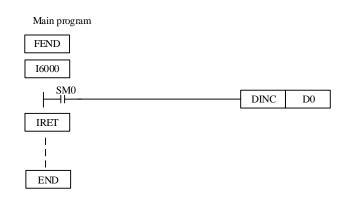
The PLC has 6 pulse segments, the pulse output terminal is Y0, but the pulse is not continuous outputting.

data s	tart address:	HD0	user params address:	HD100 system params: K1	output: Y0	
mode		relative 🗸	start execute section count:	0 Config		
Add	Delete	Jpwards Do	wnwards			
		frequence	pulse count	wait condition	wait register	jump register
	1	1000	1000	pulse sending complete	KO	КЗ
:	2	2000	2000	pulse sending complete	KO	K6
:	3	3000	3000	pulse sending complete	KO	KБ
	4	4000	4000	pulse sending complete	KO	KO
!	5	5000	5000	pulse sending complete	KO	К2
	6	6000	6000	pulse sending complete	KD	K4

As the pulse configuration table, the pulse outputting sequence is segment 1, 3, 5, 2, 6, 4. The interruption flag is I6000, I6002, I6004, I6001, I6005, I6003, please see below diagram:



Note: the program format is same for pulse interruption and external interruption.



1-2-1-5. Pulse monitoring coil and register

> P	ulse sending fla	ag		
No.	Coil	Axis no.	Note	
1	SM1000	PULSE_1	The coil is ON when the pulse is sending, the	
2	SM1020	PULSE_2	coil will be OFF when the pulse sending ends.	
3	SM1040	PULSE_3	The falling edge of coil can judge whether the	
4	SM1060	PULSE_4	pulse sending is completed.	
5	SM1080	PULSE_5		
6	SM1100	PULSE_6	Frequency	
7	SM1120	PULSE_7		
8	SM1140	PULSE_8		
9	SM1160	PULSE_9	Pulse segment	
10	SM1180	PULSE_10	0 t SM1000	

Pulse sending direction flag

No.	Coil	Axis no.	Note	
1	SM1001	PULSE_1	When the pulse number is positive value and	
2	SM1021	PULSE_2	forward direction, the coil is ON, when the	
3	SM1041	PULSE_3	pulse number is negative value and reverse	
4	SM1061	PULSE_4	direction, the coil is OFF.	
5	SM1081	PULSE_5		
6	SM1101	PULSE_6	Frequency	
7	SM1121	PULSE_7	Pulse	
8	SM1141	PULSE_8	segment /	
9	SM1161	PULSE_9		
10	SM1181	PULSE_10	SM10 <u>01</u>	

High speed pulse special regsiter HSD (latched)

No.	Function	Note	Axis no.	
HSD0	Cumulative pulses low 16-bit	The second is a second second second		
HSD1	Cumulative pulses high 16-bit	The unit is pulse number		
HSD2	Cumulative pulses low 16-bit	The sould be continued on the	PULSE_1	
HSD3	Cumulative pulses high 16-bit	The unit is equivalent		
HSD4	Cumulative pulses low 16-bit	The		
HSD5	Cumulative pulses high 16-bit	The unit is pulse number		
HSD6	Cumulative pulses low 16-bit		PULSE_2	
HSD7	Cumulative pulses high 16-bit	The unit is equivalent		
HSD8	Cumulative pulses low 16-bit			
HSD9	Cumulative pulses high 16-bit	The unit is pulse number		
HSD10	Cumulative pulses low 16-bit	The state is the	PULSE_3	
HSD11	Cumulative pulses high 16-bit	The unit is equivalent		
HSD12	Cumulative pulses low 16-bit			
HSD13	Cumulative pulses high 16-bit	The unit is pulse number		
HSD14	Cumulative pulses low 16-bit	The unit is a main land	PULSE_4	
HSD15	Cumulative pulses high 16-bit	The unit is equivalent		
HSD16	Cumulative pulses low 16-bit		PULSE_5	
HSD17	Cumulative pulses high 16-bit	The unit is pulse number		
HSD18	Cumulative pulses low 16-bit	The state is the		
HSD19	Cumulative pulses high 16-bit	The unit is equivalent		
HSD20	Cumulative pulses low 16-bit			
HSD21	Cumulative pulses high 16-bit	The unit is pulse number	PULSE_6	
HSD22	Cumulative pulses low 16-bit	The conit is a series less t		
HSD23	Cumulative pulses high 16-bit	The unit is equivalent		
HSD24	Cumulative pulses low 16-bit			
HSD25	Cumulative pulses high 16-bit	The unit is pulse number	DILLOF 7	
HSD26	Cumulative pulses low 16-bit	The sould be continued on the	PULSE_7	
HSD27	Cumulative pulses high 16-bit	The unit is equivalent		
HSD28	Cumulative pulses low 16-bit	The unit is mules mumber		
HSD29	Cumulative pulses high 16-bit	The unit is pulse number	DILLCE O	
HSD30	Cumulative pulses low 16-bit	The sould be controlleged	PULSE_8	
HSD31	Cumulative pulses high 16-bit	The unit is equivalent		
HSD32	Cumulative pulses low 16-bit	The unit is pulse number		
HSD33	Cumulative pulses high 16-bit	The unit is pulse number	DINCEO	
HSD34	Cumulative pulses low 16-bit	The unit is acquired art	PULSE_9	
HSD35	Cumulative pulses high 16-bit	The unit is equivalent		
HSD36	Cumulative pulses low 16-bit			
HSD37	Cumulative pulses high 16-bit	The unit is pulse number	PULSE_10	
HSD38	Cumulative pulses low 16-bit	The unit is equivalent		

HSD39	Cumulative pulses high 16-bit	

1-2-2. Multi-segment pulse output [PLSR]

Instruction overview

Multi-segment pulse output instruction.

Multi-segment pulse output [PLSR]						
16-bit	-	32-bit	PLSR			
Execution	Rising /falling edge of the coil	Suitable	XD, XL (except XD1, XL1)			
condition		model				
Hardware	-	Software	-			

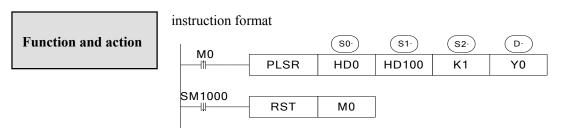
Operand

Operand	Function	Туре
S0	Pulse data start address	32-bit double word
S 1	User parameter start address	32-bit double word
S2	System parameter start address (1 to 4)	32-bit double word
D	Pulse output terminal	Bit

• Suitable soft component

Word	Operand		System								Constant	Module	
		D*	F	D	TD*	CD	DX	DY	DM*	DS^*	K/H	ID	QD
	S0	•	•		•	*	•	•	•	•			
	S1	•	•		•	•	•	•	•	•			
	S2	•	•								•		
	Operand				Sys	tem			7				
Bit		Х	Y	M^*	S*	T*	C*	Dnm					
	D		•										

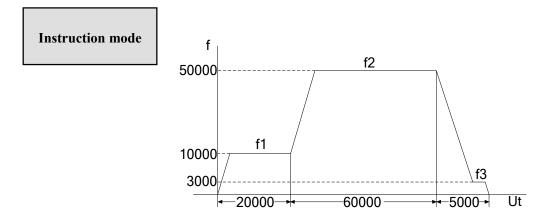
*Note: D means D, HD. TD means TD, HTD. CD means CD, HCD, HSCD, HSD. DM means DM, DHM. DS means DS, DHS. M means M, HM, SM. S means S, HS. T means T, HT. C means C, HC.



- S0 【data start address】 refer to chapter 1-2-1-1
- S1 [user parameter start address] refer to chapter 1-2-1-2
- S2 [system parameter group] K1~K4, refer to 1-2-1-3
- D [pulse output terminal] refer to chapter 1-1
- Pulse frequency range: 1Hz~100KHz. The value increasing means acceleration, the value

decreasing means deceleration, it is not related to the pulse direction.

- Pulse number: K-2,147,483,648 ~ K2,147,483,647, negative value means reverse direction. The acceleration and deceleration is set in system parameters, refer to chapter 1-2-1-3.
- When M0 is from OFF to ON, PLC executes the instruction PLSR, even M0 is cut off, the pulse will keep sending until end.
- If it needs to stop the pulse outputting, please use the instruction STOP.
- When the pulse is sending, the pulse sending flag of Y0 axis SM1000 is ON, when the pulse sending ends, SM1000 is OFF.
- Y0 cumulative pulse numbers are saved in HSD0(double word), the present pulse numbers are saved in SD1002(double word), more details please refer to chapter 6-5.
- For the instruction PLSR, if the frequency is changed when the pulse is sending, it will be effective at once. Other parameters will not be effective at once after changing, but be effective when the condition triggerring next time.
- In absolute mode, if the pulse numbers and cumulative pulse numbers(HSD0) is equal, SM1000 has no action, there is no falling edge.



Pulse curve

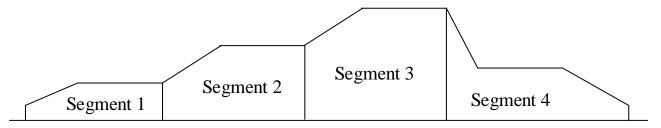
data start ad	dress: HD0	user params address:	HD100 system params: K1	output: Y0	
mode: relative V start e		start execute section count:	0 Config		
Add Del	ete Upwards Do	wnwards			
	frequence	pulse count	wait condition	wait register	jump register
1	10000	20000	pulse sending complete	KO	KO
2	50000	60000	pulse sending complete	KO	KO
▶ 3	3000	5000	pulse sending complete	KO	KO

Pulse instruction parameter configuration table

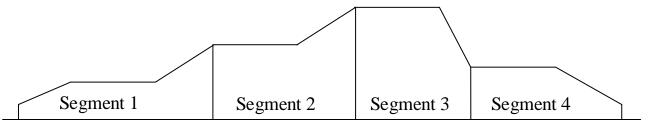
How to do

The following curves are set the parameters when the acceleration time is 0.

(1) Pulse segment completion mode division

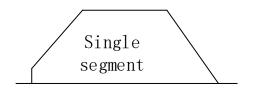


- The segment are divided as above diagram
- Except the last segment, all the segments include rising, stable and falling part.
- The last segment includes rising or falling, stable and rising or falling part.
- (2) Pulse segment subsequent mode division



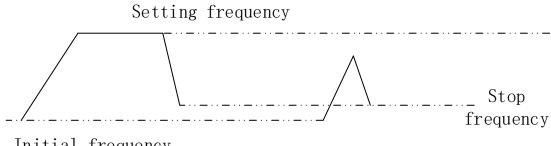
- The segment subsequent mode curve is shown as above diagram.
- It already switched to next segment speed when present segment ends. Except the first segment, other segments include stable part, rising or falling part.
- The first segment includes rising part or falling part, stable part, rising part or falling part.
- (3) Single segment pulse curve
- The pulse numbers are enough

The pulse can reach the setting max frequency, the curve is trapezoid.



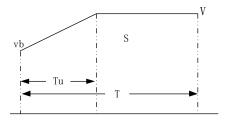
• The pulse numbers are not enough

The pulse curve is triangle.



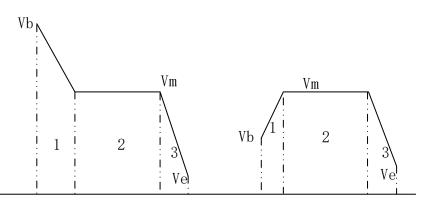
Initial frequency

(4) One segment pulse outputting (not the last segment)



- V: setting present segment frequency
- S: present segment pulse numbers
- Vb: present segment initial frequency
- T: present segment pulse sending time
- Tu: pulse rising/falling time (Tu = (V-VB) / K, K is rising or falling slope).

(5) The last segment



The last segment includes rising/falling part, stable part, rising/falling part.

(6) the segment which the pulse numbers are 0

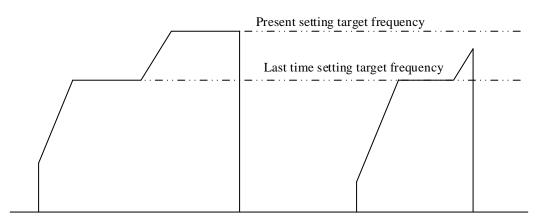
• If the present segment pulse frequency or pulse number is 0, it will output pulse as default speed.

(7) dynamic modify present pulse frequency

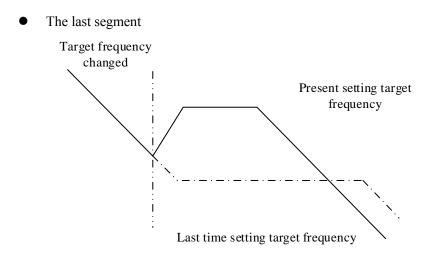
Not the last segment

Pulse numbers are enough

Pulse numbers are not enough



When the present frequency is changed, it will accelerate/decelerate to target frequency as rising/falling slope.



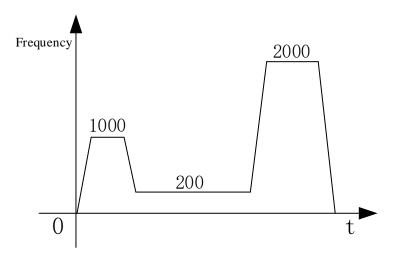
When the present pulse frequency is changed by user, PLC will calcuate the pulse curve again, then output pulse as the new pulse curve.

Example 1	
-----------	--

It needs to output 3 continuous segments of pulse, the pulse terminal is Y0, direction terminal is Y2.

Segment	Setting frequency (Hz)	Setting pulse numbers
Segment 1	1000	2000
Segment 2	200	1000
Segment 3	2000	6000
Acceleration/deceleration	The frequency will chan	ge 1000Hz every 100ms

Pulse curve



Pulse instruction

МО г					
	PLSR	HD0	HD100	K1	Y0
SM1000					
	RST	M0			

- > Software configuration
- (1) Pulse segment configuration

			multi sec	ction pulse output		
		user params address:	HD100 system params: K1	output: Y0		
		start execute section count:	0 Config			
Ad	dd Delete	Upwards Dow	nwards			
		frequence	pulse count	wait condition	wait register	jump register
	1	1000	2000	pulse sending complete	KO	KO
	2	200	1000	pulse sending complete	KO	KO
•	3	2000	6000	pulse sending complete	KO	KO
used	space: HD	0-HD39,HD100-H	ID103	Read From PLC Write To PLC	ок	Cancel

(2) Pulse configuration parameters

PLC1 - Pulse Set			
Config - Delete init axis config guide			
Param	Value		
YO axis-Common-Parameters setting-Pulse direction logic	positive logic		
YO axis-Common-Parameters setting-enable soft limit	disable		
YO axis-Common-Parameters setting-mechanical back to	negative		
YO axis-Common-Parameters setting-Pulse unit pulse number			
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi		
YO axis-Common-pulse send mode	complete		
YO axis-Common-Pulse num (1)	1		
YO axis-Common-Offset (1)	1		
YO axis-Common-Pulse direction terminal	¥2		
YO axis-Common-Delayed time of pulse direction (ms)	10		

Param	Value
YO axis-Common-Gear clearance positive compensation	0
YO axis-Common-Gear clearance negative compensation	0
YO axis-Common-Electrical origin position	0
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal
YO axis-Common-negative limit terminal setting	X no terminal
-	

Param	Value
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0

Param	Value
VO axis-group 1-Pulse default speed	1000
YO axis-group 1-Acceleration time of Pulse default :	s 100
YO axis-group 1-Deceleration time of pulse default :	s 100
VO axis-group 1-Acceleration and deceleration time	(ms) 0
VO axis-group 1-pulse acc/dec mode	linear acc/dec
VO axis-group 1-Max speed	200000
VO axis-group 1-Initial speed	0
YO axis-group 1-stop speed	0
VO axis-group 1-FOLLOW performance param(1-100)	50
YO axis-group 1-FOLLOW forward compensation(0-100)	0

(3) Pulse data address distribution table

Address	Notes Value		
HD0 (double word)	Pulse total segments (1 to 100)		
HD2 (8 words)	Reserved	0	
HD10		0	
(double words)	Pulse frequency (#1)	1000	
HD12 (double word)	Pulse number (#1)	2000	
	bit15~bit8: waiting condition (#1)		
	H00: pulse sending completion		
	H01: wait time		
	H02: wait signal		
	H03: ACT time		
	H04: EXT signal		
	H05: EXT signal or pulse sending completion		
HD14	bit7~bit0: waiting condition register type	0	
	H00: constant		
	H01: D		
	H02: HD		
	H03: FD		
	H04: X		
	H05: M		
	H06: HM		
HD15			
(double word)	Constant value/ register no. (for waiting condition)(#1)	0	
	bit7~bit0: jump register type		
11017	H00: constant value		
HD17	H01: D	0	
	H02: HD		

	H03: FD	
HD+18	Constant value/register no. (for jump register)(#1)	0
(double word)		
HD+20	Pulse frequency (#2)	200
(double word)		
HD+22	Pulse number (#2)	1000
(double word)		
HD+24	Waiting condition, waiting condition register type (#2)	0
HD+25	Constant value or register no. (for waiting condition) (#2)	0
(double word)	Constant value or register no. (for waiting condition) (#2)	0
HD+27	Jump type, jump register type (#2)0	
HD+28	Constant value or register no. (for jump register) (#2)	0
(double word)	Constant value or register no. (for jump register) (#2)	0
HD+30	Dulas frequency (#2)	2000
(double word)	Pulse frequency (#3)	2000
HD+32	Dulgo number $(\#2)$	6000
(double word)	Pulse number (#3)	0000
HD+34	Waiting condition, waiting condition register type (#3)0	
HD+35	Constant and a maximum (frame iting and 100 m) (12)	0
(double word)	Constant value or register no. (for waiting condition) (#3)	0
HD+37	Jump type, jump register type (for waiting condition) (#3) 0	
HD+38		
(double word)	Constant value or register no. (for jump register) (#3)	0

				P
		Bit 1: pulse direction logic		Cot
		0: positive logic 1: negative logic,		Common parameter
		default is 0		d uc
		Bit 2: use soft limit function		oarai
		0: not use 1: use default is 0		met
		Bit 3: mechanical return to origin		er
		direction		
		0: negative direction 1: positive		
		direction default is 0		
SFD900	Pulse parameter setting	Bit 10~8: pulse unit	0	
		Bit8: 0: pulse number 1: equivalent		
		000: pulse number		
		001: 1 um		
		011: 0.01mm		
		101: 0.1mm		
		111: 1 mm		
		Default is 000		
		Bit15: interpolation coordinate mode		
		0: cross coordinate 1: polar coordinate		
		Default is 0		-
		Bit 0: pulse sending mode		
SFD901	Pulse sending mode	0: complete mode 1: subsequence	0	
		mode, default is 0		-
SFD902	Pulse number/1 rotation low		1	
512702	16 bits		-	
SFD903	Pulse number/1 rotation high		0	
512705	16 bits		Ŭ	
SFD904	Motion quantity/1 rotation		1	
512701	low 16 bits		1	-
SFD905	Motion quantity/1 rotation		0	
51 D 703	high 16 bits		Ū	
SFD906	Pulse direction terminal	Y terminal no., 0xFF is no terminal	2	
SFD907	Direction delay time	Default is 20, unit: ms	20	
SFD908	Gear clearance positive		0	
51 0 900	compensation		0	
SFD909	Gear clearance negative		0	
51 0 7 0 7	compensation			
SFD910	Electrical origin low 16 bits		0	
SFD911	Electrical origin high 16 bits		0	

			1	1
		Bit0: origin signal switch state		
		Bit1: Z phase switch state		
		Bit2: positive limit switch state		
SFD912	Signal terminal state setting	Bit3: negative limit switch state	0	
		0: normally open(positive logic)		
		1: normally close(negative logic)		
		default is 0		
SFD914	7 phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no	0xFF	
SFD914	Z phase terminal setting	terminal(interruption)	υχγγ	
		Bit7~bit0: X terminal of positive		
SFD915	Limit torminal sotting	limit, 0xFF is no terminal	FFFF	
SFD915	Limit terminal setting	Bit15~bit8: X terminal of negative	ГГГГ	
		limit, 0xFF is no terminal		
SFD917	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no	0. EE	
35031/	terminal	terminal	0xFF	
SFD918	Returning speed VH low 16		0	
SFD918	bits		0	
SFD919	Returning speed VH high 16		0	
SFD919	bits		0	
SFD922	Crawling speed VC low 16		0	
SFD922	bits		0	
SFD923	Crawling speed VC high 16		0	
SFD925	bits		0	
SFD924	Mechanical origin position		0	
SFD924	low 16 bits		0	
SFD925	Mechanical origin position		0	
51 D 9 2 5	high 16 bits		0	
SFD926	Z phase numbers		0	
SFD927	CLR signal delay time	Default 20, unit: ms	20	
SFD928	Grinding wheel radius(polar	Low 16 bits	0	
SFD929	coordinate)	High 16 bits	0	
SFD930	Soft limit positivo limit vol	Low 16 bits	0	
SFD931	Soft limit positive limit value	High 16 bits	0	
SFD932	Soft limit negative limit	Low 16 bits	0	
SFD933	value	High 16 bits	0	
				1
•••				
CED050	Pulse default speed low 16		1000	G
SFD950	bits		1000	Group 1
SED071	Pulse default speed high 16	It will send pulse with default speed	0	7 –
SFD951	bits	when the speed is 0.	0	
SED052	Pulse default speed		100	1
SFD952	acceleration time		100	

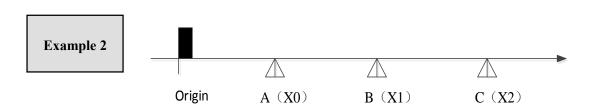
SFD953	Pulse default speed deceleration time		100
SFD954	Acceleration and deceleration time		0
SFD955	Pulse acceleration and deceleration mode	Bit 1~0: acc/dec mode 00: line 01: S curve 10: sine curve 11: reserved Bit 15~2: reserved	
SFD956	Max speed limit low 16 bits		3392
SFD957	Max speed limit high 16 bits		3
SFD958	Initial speed low 16 bits		0
SFD959	Initial speed high 16 bits		0
SFD960	Stop speed low 16 bits		0
SFD961	Stop speed high 16 bits		0
SFD962	Follow performance parameters	$1 \sim 100$, 100 means the time constant is one tick, 1 means the time constant is 100 tick.	50
SFD963	Follow feedforward compensation	0~100, percentage	0
•••			

- ※1: As there are many configuration parameters of PLSR, we suggest to use software configuration table to set the parameters.
- *2: if user needs to set each segment pulse frequency and pulse numbers in the HMI, please configure through the configuration table first, then use instruction DMOV in the program to set the registers (S0+N*10+0, S0+N*10+2).

For example:

DMOV	HD200	HD10	//HD200 set segment 1 pulse frequency in HMI
DMOV	HD202	HD12	//HD202 set segment 1 pulse numbers in HMI
DMOV	HD204	HD20	//HD204 set segment 2 pulse frequency in HMI
DMOV	HD206	HD22	//HD206 set segment 2 pulse numbers in HMI
DMOV	HD208	HD30	//HD208 set segment 3 pulse frequency in HMI
DMOV	HD210	HD32	//HD210 set segment 3 pulse numbers in HMI

It can also set pulse frequency and numbers in registers HD10, HD12, HD20, HD22, HD30, HD32 directly in the HMI.

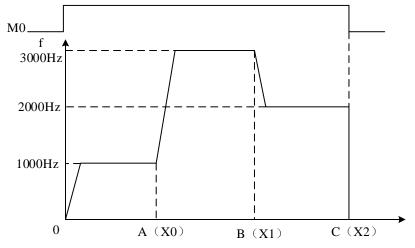


As the above diagram, it needs to move three segments of distance, the position of A, B, C is unknown and the moving speed is different for each segment. We can configure the PLSR to do it. First we install proximity switch at point A, B, C and connect to PLC input X0, X1, X2. The pulse output terminal is Y0, the direction terminal is Y2.

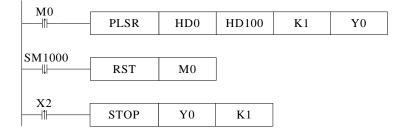
Segment	Frequency setting (Hz)	Pulse number setting
Origin to A	1000	999999999
A to B	3000	999999999
B to C	2000	999999999
Acceleration/deceleration time	The frequency will change 1000Hz every 100ms	

Note:

As the pulse numbers are unknown for each segment, we set a very large pulse numbers to ensure it can reach the proximity switch. When it reaches point C, the pulse will urgent stop by instruction STOP.



Pulse instructions



Software configuration

(1) Pulse segment configuration

multi section pulse output								
		user params address: start execute section count:	HD100 system params: K1		output:	YO		
Add Delete Upwards Downwards								
⊢	1	1000	999999999	EXT signal		regi X(register KO
	2	2000	999999999	EXT signal		X	1	KD
•	3	2000	999999999	EXT signal		X2	2	KO
used space: HD0-HD39,HD100-HD103 Read From PLC Write To PLC OK Cancel								

(2) Pulse configuration parameters

Param	Value
YO axis-Common-Parameters setting-Pulse direction logic	positive logic
YO axis-Common-Parameters setting-enable soft limit	disable
YO axis-Common-Parameters setting-mechanical back to th	negative
YO axis-Common-Parameters setting-Pulse unit	pulse number
YO axis-Common-Parameters setting-Interpolation coordin	Cross coordi
YO axis-Common-pulse send mode	complete
YO axis-Common-Pulse num (1)	1
YO axis-Common-Offset (1)	1
YO axis-Common-Pulse direction terminal	¥2
YO axis-Common-Delayed time of pulse direction (ms)	10

Param	Value
YO axis-Common-Gear clearance positive compensation	0
YO axis-Common-Gear clearance negative compensation	0
YO axis-Common-Electrical origin position	0
YO axis-Common-signal terminal switch state setting-Far	normally on
YO axis-Common-signal terminal switch state setting-Z p	normally on
YO axis-Common-signal terminal switch state setting-pos	normally on
YO axis-Common-signal terminal switch state setting-neg	normally on
YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal

Param	Value
YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0

Param		Value
¥O axis-group	1-Pulse default speed	1000
YO axis-group	1-Acceleration time of Pulse default spee	100
YO axis-group	1-Deceleration time of pulse default spee	100
YO axis-group	1-Acceleration and deceleration time (ms)	0
YO axis-group	1-pulse acc/dec mode	linear acc/dec
YO axis-group	1-Max speed	200000
YO axis-group	1-Initial speed	0
YO axis-group	1-stop speed	0
YO axis-group	1-FOLLOW performance param(1-100)	50
YO axis-group	1-FOLLOW forward compensation(0-100)	0

(3) Pulse data address distribution table

Address	Notes	Value	
HD0	Pulse total segments (1 to 100)	3	
(double word)	ruise total segments (1 to 100)	5	
HD2 (8 words)	Reserved	0	
HD10	Pulse frequency (#1)	1000	
(double words)	ruise nequency (#1)	1000	
HD12 (double	Pulse number (#1)	9999999999	
word)	r uise number (#1)		
	bit15~bit8: waiting condition (#1)		
	H00: pulse sending completion		
	H01: wait time		
HD14	H02: wait signal	1028	
	H03: ACT time		
	H04: EXT signal		
	H05: EXT signal or pulse sending completion		

	bit7~bit0: waiting condition register type	
	H00: constant	
	H01: D	
	H02: HD	
	H03: FD	
	H04: X	
	H05: M	
	H06: HM	
HD15 (double word)	Constant value/ register no. (for waiting condition)(#1)	0
(double word)	hit7 hit01 iump register ture	
	bit7~bit0: jump register type	
HD17	H00: constant value	0
HD1/	H01: D	0
	H02: HD	
	H03: FD	
HD+18	Constant value/register no. (for jump register)(#1)	0
(double word)		
HD+20	Pulse frequency (#2)	3000
(double word)		9999999999
HD+22		
(double word)		1000
HD+24	Waiting condition, waiting condition register type (#2)	1028
HD+25	Constant value or register no. (for waiting condition) (#2)	1
(double word)		
HD+27	Jump type, jump register type (#2)	0
HD+28	Constant value or register no. (for jump register) (#2)	0
(double word)	······································	-
HD+30	Pulse frequency (#3)	2000
(double word)	····· ································	
HD+32	Pulse number (#3)	9999999999
(double word)	d)	
HD+34	ID+34 Waiting condition, waiting condition register type (#3)	
HD+35	Constant value or register no. (for waiting condition) (#3)	2
(double word)	Constant value of register no. (for waiting condition) (#5)	2
HD+37	ID+37 Jump type, jump register type (for waiting condition) (#3)	
HD+38	Constant value or register no. (for jump register) (#3)	0
(double word)		Ŭ

SFD900Pulse parameter settingBit 1: pulse direction logic 0: positive logic 1: negative logic, default is 0 Bit 2: use soft limit function 0: not use 1: use default is 0 Bit 3: mechanical return to origin direction 1: positive direction coordinate Default is 000 Bit15: interpolation coordinate Default is 0SFD901Pulse sending mode Pulse number/1 rotation low 16 bits0SFD903Pulse number/1 rotation high 16 bits1SFD904Motion quantity/1 rotation low 16 bits0SFD905Motion quantity/1 rotation high 16 bits2SFD906Pulse direction terminal compensationY terminal no., 0xFF is no terminal 0SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0SFD901Electrical origin low 16 bits0			Dit 1. mulas dimention 1.			
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SFD904Motion quantity/1 rotation low 16 bits0SFD905Motion quantity/1 rotation high 16 bits2SFD906Pulse direction terminalY terminal no., 0xFF is no terminal20SFD907Direction delay timeDefault is 20, unit: ms0SFD908Gear clearance positive compensation00SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD903	-		1		
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SFD905Motion quantity/1 rotation high 16 bits2SFD906Pulse direction terminalY terminal no., 0xFF is no terminal20SFD907Direction delay timeDefault is 20, unit: ms0SFD908Gear clearance positive compensation00SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD904			0		
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SFD906Pulse direction terminalY terminal no., 0xFF is no terminal20SFD907Direction delay timeDefault is 20, unit: ms0SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD905			2		
SFD907Direction delay timeDefault is 20, unit: ms0SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD906	6	Y terminal no., 0xFF is no terminal	20		
SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0						
SFD908compensation0compensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0		5				
SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD908	1		0		
SFD9090compensation0SFD910Electrical origin low 16 bits0		-				
SFD910 Electrical origin low 16 bits 0	SFD909	c		0		
	SFD910			0		
		Electrical origin high 16 bits				

			1	1	
		Bit0: origin signal switch state			
		Bit1: Z phase switch state			
		Bit2: positive limit switch stateterminal state settingBit3: negative limit switch state			
SFD912	Signal terminal state setting	0xFF			
		0: normally open(positive logic)			
		1: normally close(negative logic)			
		default is 0			
SFD914	Z phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no	FFFF		
51 0914	Z phase terminal setting	terminal(interruption)	ГГГГ		
		Bit7~bit0: X terminal of positive			
SFD915	Limit terminal setting	limit, 0xFF is no terminal	0xFF		
511915	Linin terminal setting	Bit15~bit8: X terminal of negative	UXIT		
		limit, 0xFF is no terminal			
SFD917	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no	0		
SFD917	terminal	terminal	0		
SFD918	Returning speed VH low 16		0		
SFD918	bits		0		
SFD919	Returning speed VH high 16		0		
SFD919	bits		0		
SED022	Crawling speed VC low 16				
SFD922	bits		0		
SFD923	Crawling speed VC high 16		0		
SFD925	bits		0		
SFD924	Mechanical origin position		0		
SFD924	low 16 bits		0		
SFD925	Mechanical origin position		0		
5110925	high 16 bits		U		
SFD926	Z phase numbers		20		
SFD927	CLR signal delay time	Default 20, unit: ms	0		
SFD928	Grinding wheel radius(polar	Low 16 bits	0		
SFD929	coordinate)	High 16 bits	0		
SFD930		Low 16 bits	0		
SFD931	Soft limit positive limit value	High 16 bits	0	1	
SFD932	Soft limit negative limit	Low 16 bits	0	1	
SFD933	value	High 16 bits	1	1	
				1	
	Pulse default speed low 16		1000	G	
SFD950	bits		1000	Group 1	
	Pulse default speed high 16	It will send pulse with default speed	_	1	
SFD951	bits	when the speed is 0.	0		
	Pulse default speed	-	100	1	
SFD952					

	Pulse default speed		
SFD953	deceleration time		100
	Acceleration and		0
SFD954	deceleration time		
		Bit 1~0: acc/dec mode	
		00: line	
SFD955	Pulse acceleration and	01: S curve	0
SFD933	deceleration mode	10: sine curve	0
		11: reserved	
		Bit 15~2: reserved	
SFD956	Max speed limit low 16 bits		3392
SFD957	Max speed limit high 16 bits		3
SFD958	Initial speed low 16 bits		0
SFD959	Initial speed high 16 bits		0
SFD960	Stop speed low 16 bits		0
SFD961	Stop speed high 16 bits		0
	E-ll	1~100, 100 means the time constant is	50
SFD962	Follow performance	one tick, 1 means the time constant is	
	parameters	100 tick.	
SFD963	Follow feedforward		0
350903	compensation	0~100, percentage	
•••			

- ※1: As there are many configuration parameters of PLSR, we suggest to use software configuration table to set the parameters.
- *2: if user needs to set each segment pulse frequency and pulse numbers in the HMI, please configure through the configuration table first, then use instruction DMOV in the program to set the registers (S0+N*10+0, S0+N*10+2).

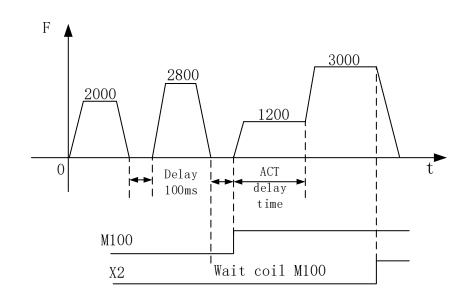
For example:

DMOV	HD200	HD10	//HD200 set segment 1 pulse frequency in HMI
DMOV	HD202	HD12	//HD202 set segment 1 pulse numbers in HMI
DMOV	HD204	HD20	//HD204 set segment 2 pulse frequency in HMI
DMOV	HD206	HD22	//HD206 set segment 2 pulse numbers in HMI
DMOV	HD208	HD30	//HD208 set segment 3 pulse frequency in HMI
DMOV	HD210	HD32	//HD210 set segment 3 pulse numbers in HMI

It can also set pulse frequency and numbers in registers HD10, HD12, HD20, HD22, HD30, HD32 directly in the HMI.

Example 3

It needs to execute 4 segments of pulse: segment 1 pulse frequency is 2000Hz, pulse number is 3000, it will delay 100ms then segment 2 is executed. Segment 2 pulse frequency is 2800Hz, pulse number is 4000. It will wait for M100, when M100 is ON, the segment 3 starts to run. Segment 3 pulse frequency is 1200Hz, pulse number is 999999999. It will delay ACT time 2s after the pulse is outputting then switch to segment 4 at once. Segment 4 pulse frequency is 3000Hz, pulse number is 9999999999. When the external signal X2 is ON, it will decelerate and stop the pulse. Pulse acceleration slope is 80ms every 1000Hz, deceleration slope is 120ms every 1000Hz. The pulse direction terminal is Y2.



 \triangleright Pulse curve:

Pulse instruction

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MO					
	– PLSR	HD0	HD100	K1	Y0

- Pulse data configuration
- (1) Pulse segment configuration

node: relative start execute section count: O Config Add Delete Upwards Downwards Downwards Section count: O Config Add Delete Upwards Downwards pulse count wait condition wait register register 1 2000 3000 wait time K100 K00 2 2800 4000 wait signal M100 K0 3 1200 999999999 ACT time K2000 K0 4 3000 999999999 EXT signal X2 K0	data start address: HD0 user para		rams address:	ms address: HD100 system params: K1		output:	YO					
frequencepulse countwait conditionwait registerjump register120003000wait timeK100K0228004000wait signalM100K031200999999999ACT timeK2000K0	mode: relative V start execu			ecute section count:	0	Config]					
1 2000 3000 wait time K100 K0 2 2800 4000 wait signal M100 K0 3 1200 999999999 ACT time K2000 K0	Add Delete Upwards Downwards											
2 2800 4000 wait signal M100 KO 3 1200 999999999 ACT time K2000 KD				frequence		pulse count		wait condition				jump register
3 1200 999999999 ACT time K2000 K0	►	1 2000		3000		wait time		K10)0	KO		
		2		2800		4000		wait signal		M10)0	KO
4 3000 999999999 EXT signal X2 K0		3		1200		999999999	ACT time		K20	K2000	KO	
	4 3000 999999999		999999999	EXT signal			X	X2				

Pulse data configuration (relative mode)

multi section pulse output X												
data start a	address:	HD0	user par	ams address:	HD100	system param	ns: K1		output:	YO		
mode: absolut V start exec			ecute section count:	0	Config							
Add Delete Upwards Downwards												
frequence			pulse count		wait conditi	on		wa regi		jump register	1	
1 2000			3000		wait tim	ie		K10	0	KO		
2		2800		7000	wait signal			M10	10	KO		
3		1200		1000006999		ACT time			K2000		KO	
▶ 4		3000		2000006998		EXT sign:	ન		X2	:	KO	1
used space	: HDO	-HD49,HD10	D-HD103		Read	From PLC	Write To	PLC		ок	Cancel	_

Pulse data configuration (absolute mode)

Param	Value
YO axis-Common-Parameters setting-Pulse direction logic	positive logic
YO axis-Common-Parameters setting-enable soft limit	disable
YO axis-Common-Parameters setting-mechanical back to	negative
YO axis-Common-Parameters setting-Pulse unit	pulse number
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi
YO axis-Common-pulse send mode	complete
YO axis-Common-Pulse num (1)	1
YO axis-Common-Offset (1)	1
YO axis-Common-Pulse direction terminal	¥2
YO axis-Common-Delayed time of pulse direction (ms)	10

Param	Value
0 axis-Common-Gear clearance positive compensation	0
0 axis-Common-Gear clearance negative compensation	0
0 axis-Common-Electrical origin position	0
0 axis-Common-signal terminal switch state setting	normally on
0 axis-Common-signal terminal switch state setting	normally on
0 axis-Common-signal terminal switch state setting	normally on
0 axis-Common-signal terminal switch state setting	normally on
0 axis-Common-Far-point signal terminal setting	X no terminal
0 axis-Common-Z phase terminal setting	X no terminal
0 axis-Common-positive limit terminal setting	X no terminal
Param	Value
0 axis-Common-negative limit terminal setting	X no terminal
0 axis-Common-Zero clear CLR output setting	Y no terminal
70 axis-Common-Return speed VH	0
70 axis-Common-Creeping speed VC	0
0 axis-Common-Mechanical zero position	0
0 axis-Common-Z phase num	0
70 axis-Common-CLR signal delayed time (ms)	20
0 axis-Common-grinding wheel radius(polar)	0
70 axis-Common-soft limit positive value	0
0 axis-Common-soft limit negative value	0
Param	Value
0 axis-group 1-Pulse default speed	1000
0 axis-group 1-Acceleration time of Pulse default s	80
0 axis-group 1-Deceleration time of pulse default s	120
0 axis-group 1-Acceleration and deceleration time (ms)	0
10 axis-group 1-pulse acc/dec mode	linear acc/dec
0 axis-group 1-Max speed	200000
0 axis-group 1-Initial speed	0
0 axis-group 1-stop speed	0
0 axis-group 1-FOLLOW performance param(1-100)	50

(3) Pulse data address distribution table

Address	Notes	Value
HD0	Pulse total segments (1 to 100)	4
(double word)	Pulse total segments (1 to 100)	4

HD2 (8 words)	Reserved	0
HD10	Pulse frequency (#1)	2000
(double words)	Pulse frequency (#1)	2000
HD12 (double	Pulse number (#1)	3000
word)		3000
	bit15~bit8: waiting condition (#1)	
	H00: pulse sending completion	
	H01: wait time	
	H02: wait signal	
	H03: ACT time	
	H04: EXT signal	
	H05: EXT signal or pulse sending completion	
HD14	bit7~bit0: waiting condition register type	256
	H00: constant	
	H01: D	
	H02: HD	
	H03: FD	
	H04: X	
	H05: M	
	H06: HM	
HD15	Constant value/ register no. (for waiting condition)(#1)	100
(double word)		
	bit7~bit0: jump register type	
	H00: constant value	
HD17	H01: D	0
	H02: HD	
	H03: FD	
HD+18	Constant value/register no. (for jump register)(#1)	0
(double word)		
HD+20	Pulse frequency (#2)	2800
(double word)		
HD+22	Pulse number (#2)	7000
(double word)		
HD+24	Waiting condition, waiting condition register type (#2)	517
HD+25	Constant value or register no. (for waiting condition) (#2)	100
(double word)		
HD+27	Jump type, jump register type (#2)	0
HD+28	Constant value or register no. (for jump register) (#2)	0
(double word)		Ť
HD+30	Pulse frequency (#3)	1200
(double word)		1200
HD+32	Pulse number (#3)	9999999999
(double word)		

HD+34	Waiting condition, waiting condition register type (#3)	768
HD+35	Constant value or register no. (for waiting condition) (#3)	2000
(double word)	Constant value of register no. (for waiting condition) (#3)	2000
HD+37	Jump type, jump register type (for waiting condition) (#3)	0
HD+38	Constant value or register no. (for jump register) (#2)	0
(double word)	Constant value or register no. (for jump register) (#3)	0
HD+40	Pulse frequency (#4)	3000
(double word)	Fulse frequency (#4)	3000
HD+42	Pulse number (#4)	9999999999
(double word)	Pulse humber (#4)	9999999999
HD+44	Waiting condition, waiting condition register type (#4)	1028
HD+45	Constant value or register no. (for waiting condition) $(\#4)$	2
(double word)	Constant value or register no. (for waiting condition) (#4)	2
HD+47	Jump type, jump register type (for waiting condition) (#4)	0
HD+48	Constant value or register no. (for iuma register) (#4)	0
(double word)	Constant value or register no. (for jump register) (#4)	0

, ,						
		Bit 1: pulse direction logic		Co		
		0: positive logic 1: negative logic,		mm		
		default is 0		lon		
		Bit 2: use soft limit function		para		
		0: not use 1: use default is 0		Common parameter		
		Bit 3: mechanical return to origin				
		direction				
		0: negative direction 1: positive				
		direction default is 0				
SFD900	Pulse parameter setting	Bit 10~8: pulse unit	0			
SFD900		Bit8: 0: pulse number 1: equivalent	0			
		000: pulse number				
		001: 1 um				
		011: 0.01mm				
		101: 0.1mm				
		111: 1 mm				
		Default is 000				
		Bit15: interpolation coordinate mode				
		0: cross coordinate 1: polar coordinate				
		Default is 0				
		Bit 0: pulse sending mode				
SFD901	Pulse sending mode	0: complete mode 1: subsequence	0			
		mode, default is 0				
CED002	Pulse number/1 rotation low		1			
SFD902	16 bits		1			

	1		I
SFD903	Pulse number/1 rotation high 16 bits		0
SFD904	Motion quantity/1 rotation low 16 bits		1
SFD905	Motion quantity/1 rotation high 16 bits		0
SFD906	Pulse direction terminal	Y terminal no., 0xFF is no terminal	2
SFD907	Direction delay time	Default is 20, unit: ms	20
SFD908	Gear clearance positive compensation		0
SFD909	Gear clearance negative compensation		0
SFD910	Electrical origin low 16 bits		0
SFD911	Electrical origin high 16 bits		0
SFD912	Signal terminal state setting	 Bit0: origin signal switch state Bit1: Z phase switch state Bit2: positive limit switch state Bit3: negative limit switch state 0: normally open(positive logic) 1: normally close(negative logic) default is 0 	0
SFD914	Z phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no terminal(interruption)	0xFF
SFD915	Limit terminal setting	Bit7~bit0: X terminal of positive limit, 0xFF is no terminal Bit15~bit8: X terminal of negative limit, 0xFF is no terminal	FFFF
SFD917	Clear signal CLR output terminal	Bit0~Bit7: Y terminal, 0xFF is no terminal	0xFF
SFD918	Returning speed VH low 16 bits		0
SFD919	Returning speed VH high 16 bits		0
SFD922	Crawling speed VC low 16 bits		0
SFD923	Crawling speed VC high 16 bits		0
SFD924	Mechanical origin position low 16 bits		0
SFD925	Mechanical origin position high 16 bits		0
SFD926	Z phase numbers		0
SFD927	CLR signal delay time	Default 20, unit: ms	20

SFD928 Grinding wheel radius(polar SFD929 Low 16 bits 0 SFD920 SFD930 Oft limit positive limit value Low 16 bits 0 SFD931 Soft limit negative limit value Low 16 bits 0 SFD932 Soft limit negative limit value Low 16 bits 0 SFD933 value High 16 bits 0 "" Low 16 bits 0 SFD933 value High 16 bits 0 "" Low 16 bits 0 "" It will send pulse with default speed bits 1000 SFD950 Pulse default speed ligh 16 bits It will send pulse with default speed acceleration time 100 SFD951 Pulse default speed deceleration time 100 100 SFD953 Pulse default speed deceleration time Bit 1-0: acc/dec mode 00: line 0 SFD954 Acceleration and deceleration mode 01: S curve 10: sine curve 11: reserved Bit 15-2: reserved 3392 SFD955 Max speed limit high 16 bits 0 3392 SFD955 Initial speed high 16 bits 0 0				1	, <u> </u>
SED930 SFD931Soft limit positive limit valueLow 16 bits0SFD932 Soft limit negative limit valueLow 16 bits0SFD933soft limit negative limit valueLow 16 bits0SFD933valueHigh 16 bits0SFD950Pulse default speed low 16 bitsIt will send pulse with default speed when the speed is 0.1000SFD951Pulse default speed acceleration time10000SFD952Pulse default speed deceleration time100SFD954Acceleration and deceleration mode0SFD955Pulse acceleration and deceleration mode01: S curve 10: sine curve 11: reserved Bit 15~2: reserved0SFD955Max speed limit low 16 bits3392SFD956Max speed limit low 16 bits0SFD957Max speed limit low 16 bits0SFD958Initial speed low 16 bits0SFD959Initial speed low 16 bits0SFD950Stop speed low 16 bits0SFD951Stop speed low 16 bits0SFD952Follow performance parameters1~100, 100 means the time constant is one tick, 1 means the time constant is loot tick.SFD963Follow feedforward compensation0~100, percentage	SFD928	Grinding wheel radius(polar	Low 16 bits	0	
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SFD931 Image of the section of the s	SFD930	Soft limit positivo limit valuo	Low 16 bits	0	
SFD933valueHigh 16 bits0SFD933valueHigh 16 bits0Pulse default speed low 16 bitsIt will send pulse with default speed when the speed is 0.1000 0° SFD951Pulse default speed high 16 bitsIt will send pulse with default speed when the speed is 0.100 0° SFD952Pulse default speed deceleration time100100 0° SFD953Pulse default speed deceleration time00 0° SFD954Acceleration and deceleration time00 0° SFD955Pulse acceleration and deceleration mode 0° 0° SFD956Max speed limit low 16 bits 0° 0° SFD957Max speed limit low 16 bits 3392 3392 SFD958Initial speed low 16 bits 0° SFD959Initial speed low 16 bits 0° SFD950Stop speed low 16 bits 0° SFD951Follow performance parameters $1^{\circ}100, 100$ means the time constant is no tick. 1 means the time constant is n	SFD931	Soft mint positive mint value	High 16 bits	0	
Image: second	SFD932	Soft limit negative limit	Low 16 bits	0	
SFD950Pulse default speed low 16 bitsIt will send pulse with default speed when the speed is 0.1000 0 SFD951Pulse default speed high 16 bitsIt will send pulse with default speed when the speed is 0.0 0 SFD952Pulse default speed acceleration time1000 0 0 SFD953Pulse default speed deceleration time1000 0 SFD954Acceleration and deceleration time 0 0 SFD955Pulse acceleration and deceleration mode 0 : line 0 : line 0 SFD956Max speed limit low 16 bits 0 : sine curve 11 : reserved Bit 15-2: reserved 3 SFD957Max speed limit low 16 bits 0 3 SFD958Initial speed low 16 bits 0 0 SFD959Initial speed ligh 16 bits 0 0 SFD950Stop speed low 16 bits 0 0 SFD961Stop speed ligh 16 bits 0 0 SFD962Follow parameters $1^{-1}00, 100$ means the time constant is one tick, 1 means the time constant i	SFD933	value	High 16 bits	0	
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SFD951Fuse default speed nigh fo bitsIf will send puise with default speed when the speed is 0.0SFD952Pulse default speed acceleration time100SFD953Pulse default speed deceleration time100SFD954Acceleration and deceleration time0SFD955Pulse acceleration and deceleration modeBit 1~0: acc/dec mode 00: line 01: S curve 10: sine curve 11: reserved Bit 15~2: reserved0SFD956Max speed limit low 16 bits3392SFD957Max speed limit high 16 bits0SFD959Initial speed low 16 bits0SFD960Stop speed low 16 bits0SFD961Stop speed high 16 bits0SFD962Follow performance parameters1~100, 100 means the time constant is one tick, 1 means the time constant	SFD950	-		1000	Group
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SFD957Max speed limit high 16 bits3SFD958Initial speed low 16 bits0SFD959Initial speed high 16 bits0SFD960Stop speed low 16 bits0SFD961Stop speed high 16 bits0SFD962Follow performance parameters1~100, 100 means the time constant is one tick, 1 means the time constant is 100 tick.50SFD963Follow feedforward compensation0	SFD955		00: line 01: S curve 10: sine curve 11: reserved	0	
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SFD961 Stop speed high 16 bits 0 SFD962 Follow performance parameters 1~100, 100 means the time constant is one tick, 1 means the time constant is 100 tick. 50 SFD963 Follow feedforward compensation 0~100, percentage 0	SFD959	-		0	1
SFD962 Follow performance parameters 1~100, 100 means the time constant is one tick, 1 means the time constant is 100 tick. SFD963 Follow feedforward compensation 0	SFD960	Stop speed low 16 bits		0	1
SFD962 Follow performance one tick, 1 means the time constant is 50 parameters 100 tick. 100 tick. 0 SFD963 Follow feedforward 0 compensation 0~100, percentage 100	SFD961	Stop speed high 16 bits		0	1
SFD963 compensation 0~100, percentage	SFD962	-	one tick, 1 means the time constant is	50	
	SFD963		0~100, percentage	0	
	•••				

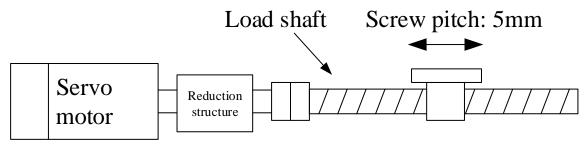
- ※1: As there are many configuration parameters of PLSR, we suggest to use software configuration table to set the parameters.
- *2: if user needs to set each segment pulse frequency and pulse numbers in the HMI, please configure through the configuration table first, then use instruction DMOV in the program to set the registers (S0+N*10+0, S0+N*10+2).
 For example:

DMOV	HD200	HD10	//HD200 set segment 1 pulse frequency in HMI
DMOV	HD202	HD12	//HD202 set segment 1 pulse numbers in HMI
DMOV	HD204	HD20	//HD204 set segment 2 pulse frequency in HMI
DMOV	HD206	HD22	//HD206 set segment 2 pulse numbers in HMI
DMOV	HD208	HD30	//HD208 set segment 3 pulse frequency in HMI
DMOV	HD210	HD32	//HD210 set segment 3 pulse numbers in HMI
DMOV	HD212	HD40	//HD212 set segment 4 pulse frequency in HMI
DMOV	HD214	HD42	//HD214 set segment 4 pulse numbers in HMI

It can also set pulse frequency and numbers in registers HD10, HD12, HD20, HD22, HD30, HD32, HD40, HD42 directly in the HMI.

Example 4

There is a transmission mechanism which includes one servo drive (electronic gear ratio is 1:1), one servo motor (encoder is 2500ppr), it connects the ball screw through a reducer (the reduction ratio is 1:2), the ball screw pitch is 10mm, the ball screw drives a working table which can move left and right. Now it needs to move the table from left to right for 200mm, then move in reverse direction for 200mm, the speed is 20mm/s, acceleration time is 100ms, deceleration time is 200ms, the pulse direction terminal is Y2.



Mechanical structure

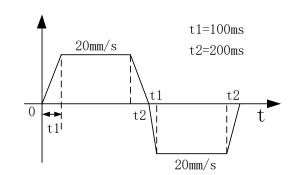
Pulse number per rotate = $20000 = 2500 * 4 * \frac{2}{1}$

Motion quantity per rotate = pitch = 10mm

$$20\text{mm/s} = \frac{20\text{mm}}{10\text{mm}} * 20000 = 40000 \text{ pulse/s}$$

The max pulse output frequency is 40K/s, less than 200K/s, the PLC can run well.

Pulse curve



> Pulse instruction

MO					
	PLSR	HD0	HD100	K1	Y0
1					

- Pulse configuration
- (1) Pulse segment configuration

				multi sec	tion pu	lse output				
data start address: HD0 user params address:		ns address:	HD100	system params:	K1	output:	YO			
mode:	node: relative 🗸 start execute section count		ute section count:	0	Config					
Add [Delete l	Jpwards Do	ownwards							
		frequence		pulse count		wait condition		wa regi	it ster	jump register
1		20 2		200	pulse sending complete			K	D	KO
▶ 2		20		-200	pulse sending complete		K	D	KO	
used spac	e: HDO	-HD29,HD100	0-HD103		Read	From PLC V	Vrite To PLO	:	ОК	Cancel

Relative mode

lata start a	t address: HD0 user params address: HD100		HD100	0100 system params: K1		output: Y0			
node:	ode: absolut v start execute section of		section count:	0	Config]			
Add De	elete Upwards I	Downwards		1	1			1	
	frequence	è]	oulse count		wait condition		wa regi	it ster	jump register
1	20		200	pulse sending complete		KI	D	KO	
2	20 0		0	pulse sending complete		K	D	KO	
Y 2 20 0 pulse sending complete no no no									

Absolute mode

(2) System parameters (relative mode)

Param	Value
YO axis-Common-Parameters setting-Pulse direction logic	positive logic
YO axis-Common-Parameters setting-enable soft limit	disable
YO axis-Common-Parameters setting-mechanical back to	negative
YO axis-Common-Parameters setting-Pulse unit	1mm
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi
YO axis-Common-pulse send mode	complete
YO axis-Common-Pulse num (1)	20000
YO axis-Common-1mm(revolve)	10
YO axis-Common-Pulse direction terminal	¥2
YO axis-Common-Delayed time of pulse direction (ms)	10

Param	Value
YO axis-Common-Gear clearance positive compensation	0
YO axis-Common-Gear clearance negative compensation	0
YO axis-Common-Electrical origin position	0
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal

Param	Value
YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0

Param	Value
YO axis-group 1-Pulse default speed	20
YO axis-group 1-Acceleration time of Pulse default s	100
YO axis-group 1-Deceleration time of pulse default s	200
YO axis-group 1-Acceleration and deceleration time (ms)	0
YO axis-group 1-pulse acc/dec mode	linear acc/dec
YO axis-group 1-Max speed	100
YO axis-group 1-Initial speed	0
YO axis-group 1-stop speed	0
YO axis-group 1-FOLLOW performance param(1-100)	50
YO axis-group 1-FOLLOW forward compensation(0-100)	0

(3) Pulse data address distribution table

Address	Notes	Value	
HD0	Pulse total segments (1 to 100)	2	
(double word)	ruise total segments (1 to 100)	2	
HD2 (8 words)	Reserved	0	
HD10	Pulse frequency (#1)	20	
(double words)	ruise nequency (#1)	20	
HD12 (double	Pulse number (#1)	200	
word)	ruise number (#1)	200	
	bit15~bit8: waiting condition (#1)		
	H00: pulse sending completion		
	H01: wait time		
HD14	H02: wait signal	0	
	H03: ACT time	0	
	H04: EXT signal		
	H05: EXT signal or pulse sending completion		
	bit7~bit0: waiting condition register type		

	H00: constant	
	H01: D	
	H02: HD	
	H03: FD	
	H04: X	
	H05: M	
	H06: HM	
HD15	Constant value/ register no. (for weiting condition)(#1)	0
(double word)	Constant value/ register no. (for waiting condition)(#1)	0
	bit7~bit0: jump register type	
	H00: constant value	
HD17	H01: D	0
	H02: HD	
	H03: FD	
HD+18	Constant value/magister no. (for imme register)(#1)	0
(double word)	Constant value/register no. (for jump register)(#1)	0
HD+20	Dulas for success (#2)	20
(double word)	Pulse frequency (#2)	20
HD+22	Pulse number (#2)	-200
(double word)		
HD+24	Waiting condition, waiting condition register type (#2)	0
HD+25		
(double word)	Constant value or register no. (for waiting condition) (#2)	0
HD+27	Jump type, jump register type (#2)	0
HD+28		0
(double word)	Constant value or register no. (for jump register) (#2)	0

SFD900	Pulse parameter setting	Bit 1: pulse direction logic 0: positive logic 1: negative logic, default is 0 Bit 2: use soft limit function 0: not use 1: use default is 0 Bit 3: mechanical return to origin direction 0: negative direction 1: positive direction default is 0 Bit 10~8: pulse unit Bit8: 0: pulse number 1: equivalent 000: pulse number 001: 1 um 011: 0.01mm 101: 0.1mm 111: 1 mm Default is 000 Bit15: interpolation coordinate mode	1792	Common parameter
		0: cross coordinate 1: polar coordinate Default is 0		
SFD901	Pulse sending mode	Bit 0: pulse sending mode 0: complete mode 1: subsequence mode, default is 0	0	
SFD902	Pulse number/1 rotation low 16 bits		20000	
SFD903	Pulse number/1 rotation high 16 bits		20000	
SFD904	Motion quantity/1 rotation low 16 bits		10	
SFD905	Motion quantity/1 rotation high 16 bits		10	
SFD906	Pulse direction terminal	Y terminal no., 0xFF is no terminal	2	
SFD907	Direction delay time	Default is 20, unit: ms	20	
SFD908	Gear clearance positive compensation		0	
SFD909	Gear clearance negative compensation		0	
SFD910	Electrical origin low 16 bits		0	
SFD911	Electrical origin high 16 bits		0	

0	
0	
0	
0	
0xFF	
υχγγ	
1	
CCCC	
ГГГГ	
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0EE	
UXFF	
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0	
0	
0	
0	
20	
0	
0	
0	
0	1
0	1
0	1
	1
I	
• 6	G
20	Group 1
	p 1
0	
	1
100	
	20 0 0 0 0 0 0 20 0

	D 1 0 1 1		
SFD953	Pulse default speed		200
	deceleration time		
SFD954	Acceleration and		0
SFD754	deceleration time		
		Bit 1~0: acc/dec mode	
		00: line	
SFD955	Pulse acceleration and	01: S curve	0
SFD955	deceleration mode	10: sine curve	0
		11: reserved	
		Bit 15~2: reserved	
SFD956	Max speed limit low 16 bits		100
SFD957	Max speed limit high 16 bits		0
SFD958	Initial speed low 16 bits		0
SFD959	Initial speed high 16 bits		0
SFD960	Stop speed low 16 bits		0
SFD961	Stop speed high 16 bits		0
		$1 \sim 100$, 100 means the time constant is	50
SFD962	Follow performance	one tick, 1 means the time constant is	
	parameters	100 tick.	
	Follow feedforward		0
SFD963	compensation	0~100, percentage	
•••			

- ※1: As there are many configuration parameters of PLSR, we suggest to use software configuration table to set the parameters.
- *2: if user needs to set each segment pulse frequency and pulse numbers in the HMI, please configure through the configuration table first, then use instruction DMOV in the program to set the registers (S0+N*10+0, S0+N*10+2).

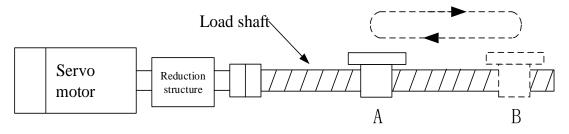
For example:

DMOV	HD200	HD10	//HD200 set segment 1 pulse frequency in HMI
DMOV	HD202	HD12	//HD202 set segment 1 pulse numbers in HMI
DMOV	HD204	HD20	//HD204 set segment 2 pulse frequency in HMI
DMOV	HD206	HD22	//HD206 set segment 2 pulse numbers in HMI

It can also set pulse frequency and numbers in registers HD10, HD12, HD20, HD22 directly in the HMI.

Example 5

There is a transmission mechanism which includes one servo drive (electronic gear ratio is 1:1), one servo motor (encoder is 2500ppr), it connects the ball screw through a reducer (the reduction ratio is 1:2), the ball screw pitch is 5mm, the ball screw drives a working table which can move left and right. Now it needs to move forth and back on the table, A to B distance is 200mm, A to B speed is 20mm/s, B to A speed is 30mm/s, acceleration time is 100ms, deceleration time is 200ms, the pulse direction terminal is Y2, the mechanical clearance of A to B to A is 3mm, B to A to B is 2mm.



Mechanical structure

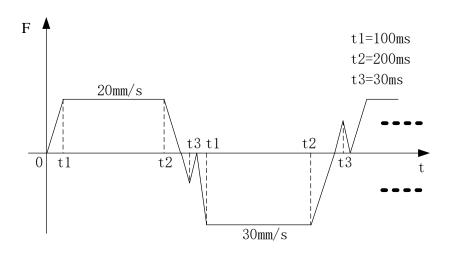
We can calculate the following things:

Pulse number per rotate= $20000 = 2500 * 4 * \frac{2}{1}$ Moving quantity= pitch = 5mm 20mm/s = $\frac{20$ mm}{5mm} * 20000 = 80000pulse/s

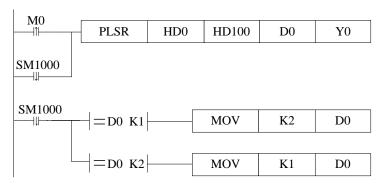
30mm/s =
$$\frac{30\text{mm}}{5\text{mm}}$$
 * 20000 = 120000pulse/s

As the acceleration and deceleration time for forward motion and reverse motion is same, but the max frequency is different, so their acceleration and deceleration slope is different. Forward acceleration slope: 80000Hz/100ms, forward deceleration slope: 80000Hz/200ms. Reverse acceleration slope: 120000Hz/100ms, reverse deceleration slope: 120000Hz/200ms. We needs to set two groups of parameter as there are two groups of acc/dec slope. The max frequency is 40K/s and 120K/s, less than 200K/s, so PLC can work normally.

Pulse curve



Pulse instruction



- Pulse data configuration
- (1) Pulse segment configuration

lata start address: node:		rams address: ecute section count:	HD100 system params: K1 0 Config	output: Y0	
Add Delete	Upwards Downwar	ds			
	frequence	pulse count	wait condition	wait register	jump register
1	20	200	pulse sending complete	KO	KO
▶ 2	30	-200	pulse sending complete	KO	KO

Relative mode

data start ad		ser params address:	HD100 system params: K	(1 output	YO	
mode:	absolut ∀ st	art execute section count:	0 Config			
Add Del	ete Upwards Down	nwards				
	frequence	pulse count	wait condition		ait ister	jump register
1	20	200	pulse sending complet	e	ко	KO
▶ 2	30	0	pulse sending complet	e	KO	KO

Absolute mode

Param	Value
YO axis-Common-Parameters setting-Pulse direction logic	positive logic
IU axis-Lommon-Farameters setting-fulse direction logic	
YO axis-Common-Parameters setting-enable soft limit	disable
YO axis-Common-Parameters setting-mechanical back to	negative
YO axis-Common-Parameters setting-Pulse unit	1mm
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi
YO axis-Common-pulse send mode	complete
YO axis-Common-Pulse num (1)	20000
YO axis-Common-1mm(revolve)	5
YO axis-Common-Pulse direction terminal	¥2
YO axis-Common-Delayed time of pulse direction (ms)	10

Param	Value
YO axis-Common-Gear clearance positive compensation	3
YO axis-Common-Gear clearance negative compensation	2
YO axis-Common-Electrical origin position	0
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal

Param	Value
YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0

Param	Value
YO axis-group 1-Pulse default speed	20
YO axis-group 1-Acceleration time of Pulse default s	100
YO axis-group 1-Deceleration time of pulse default s	200
YO axis-group 1-Acceleration and deceleration time (ms)	30
YO axis-group 1-pulse acc/dec mode	linear acc/dec
YO axis-group 1-Max speed	50
YO axis-group 1-Initial speed	0
YO axis-group 1-stop speed	0
YO axis-group 1-FOLLOW performance param(1-100)	50
YO axis-group 1-FOLLOW forward compensation(0-100)	0

Param	Value
YO axis-group 2-Pulse default speed	30
YO axis-group 2-Acceleration time of Pulse default s	100
YO axis-group 2-Deceleration time of pulse default s	200
YO axis-group 2-Acceleration and deceleration time (ms)	30
YO axis-group 2-pulse acc/dec mode	linear acc/dec
YO axis-group 2-Max speed	50
YO axis-group 2-Initial speed	0
YO axis-group 2-stop speed	0
YO axis-group 2-FOLLOW performance param(1-100)	50
YO axis-group 2-FOLLOW forward compensation(0-100)	0

(2)	Dula	data	addmaga	distribution	tabla	malatizza	mada)
(3)	- Puise (lala	address	distribution	Table	relative	moder
				410411041011			

Address	Notes	Value
HD0		2
(double word)	Pulse total segments (1 to 100)	2
HD2 (8 words)	Reserved	0
HD10	Pulse frequency (#1)	20
(double words)	Pulse frequency (#1)	20
HD12 (double	Pulse number (#1)	200
word)		200
	bit15~bit8: waiting condition (#1)	
	H00: pulse sending completion	
	H01: wait time	
	H02: wait signal	
	H03: ACT time	
	H04: EXT signal	
	H05: EXT signal or pulse sending completion	
HD14	bit7~bit0: waiting condition register type	0
	H00: constant	
	H01: D	
	H02: HD	
	H03: FD	
	H04: X	
	H05: M	
	H06: HM	
HD15	Constant value/ register no. (for waiting condition)(#1)	0
(double word)	Constant value/ register no. (for waiting condition)(#1)	0
	bit7~bit0: jump register type	
	H00: constant value	
HD17	H01: D	0
	H02: HD	
	H03: FD	
HD+18		0
(double word)	Constant value/register no. (for jump register)(#1)	0
HD+20		20
(double word)	Pulse frequency (#2)	20
HD+22	Pulse number (#2)	-200
(double word)		
HD+24	Waiting condition, waiting condition register type (#2)	0
HD+25		
(double word)	Constant value or register no. (for waiting condition) (#2)	0
HD+27	Jump type, jump register type (#2)	0
HD+28		
(double word)	Constant value or register no. (for jump register) (#2)	0

SFD900Pulse parameter setting0: positive logic 1: negative logic, default is 0 Bit 2: use soft limit function 0: not use 1: use default is 0 Bit 3: mechanical return to origin direction 0: negative direction 1: positive direction 000: pulse number 1: equivalent 000: pulse number 001: 1 um 011: 0.01mm 111: 0.1mm 111: 1 mm Default is 0 Bit 10: pulse node 0: cross coordinate 1: polar coordinate Default is 01792SFD901Pulse sending modeBit 0: pulse number 001: 1 um 011: 0.01mm 111: 1 mm Default is 0000SFD901Pulse number/1 rotation low 16 bitsBit 0: pulse sending mode 0: cross coordinate 1: subsequence mode, default is 00SFD903Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Motion quantity/1 rotation low 16 bitsS5SFD905Motion quantity/1 rotation low 16 bits200SFD906Pulse direction terminal tigh 16 bitsY terminal no., 0xFF is no terminal 22SFD908Gear clearance positive compensationComplet is 20, unit: ms20SFD908Gear clearance positive compensation03					1
SFD901Pulse sending mode 16 bitsBit 0: pulse sending mode 0: cross coordinate 1: polar coordinate Default is 000SFD902Pulse number/1 rotation low 16 bitsBit 0: pulse sending mode 0: cromplete mode 1: subsequence mode, default is 00SFD903Pulse number/1 rotation high 16 bits020000SFD904Motion quantity/1 rotation high 16 bits5SFD905Motion quantity/1 rotation high 16 bits0SFD906Pulse direction terminal bits2SFD907Direction delay time compensationDefault is 20, unit: ms20SFD908Gear clearance positive compensation03SFD909Gear clearance negative compensation03SFD909Gear clearance negative compensation03SFD909Gear clearance negative compensation03	SFD900		default is 0 Bit 2: use soft limit function 0: not use 1: use default is 0 Bit 3: mechanical return to origin direction 0: negative direction 1: positive direction default is 0 Bit 10~8: pulse unit Bit8: 0: pulse number 1: equivalent	1792	Common parameter
SFD901Pulse sending mode0: complete mode 1: subsequence mode, default is 00SFD902Pulse number/1 rotation low 16 bits20000SFD903Pulse number/1 rotation high 16 bits0SFD904Motion quantity/1 rotation low 16 bits0SFD905Motion quantity/1 rotation high 16 bits5SFD906Pulse direction terminal to bitsY terminal no., 0xFF is no terminal 2000SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0			011: 0.01mm 101: 0.1mm 111: 1 mm Default is 000 Bit15: interpolation coordinate mode 0: cross coordinate 1: polar coordinate		
SFD90216 bits20000SFD903Pulse number/1 rotation high 16 bits0SFD904Motion quantity/1 rotation low 16 bits5SFD905Motion quantity/1 rotation high 16 bits0SFD906Pulse direction terminalY terminal no., 0xFF is no terminalSFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0	SFD901	Pulse sending mode	0: complete mode 1: subsequence	0	
SFD90316 bits0SFD904Motion quantity/1 rotation low 16 bits5SFD905Motion quantity/1 rotation high 16 bits0SFD906Pulse direction terminalY terminal no., 0xFF is no terminal2SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0	SFD902			20000	
SFD904low 16 bits5SFD905Motion quantity/1 rotation high 16 bits0SFD906Pulse direction terminalY terminal no., 0xFF is no terminal2SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0	SFD903	-		0	
SFD905high 16 bits0SFD906Pulse direction terminalY terminal no., 0xFF is no terminal2SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0	SFD904			5	
SFD907 Direction delay time Default is 20, unit: ms 20 SFD908 Gear clearance positive compensation 0 SFD909 Gear clearance negative compensation 0	SFD905			0	
SFD908 Gear clearance positive 0 SFD909 Gear clearance negative 0 SFD909 Gear clearance negative 0	SFD906	Pulse direction terminal	Y terminal no., 0xFF is no terminal	2	
SFD908 compensation 0 SFD909 Gear clearance negative compensation 0	SFD907	Direction delay time	Default is 20, unit: ms	20	
SFD909 compensation 0	SFD908	1		0	
	SFD909	e		0	
SFD910 Electrical origin low 16 bits 0	SFD910	Electrical origin low 16 bits		0	
SFD911Electrical origin high 16 bits0	SFD911	Electrical origin high 16 bits		0	

r			1	1
		Bit0: origin signal switch state		
		Bit1: Z phase switch state		
		Bit2: positive limit switch state		
SFD912	Signal terminal state setting	Bit3: negative limit switch state	0	
		0: normally open(positive logic)		
		1: normally close(negative logic)		
		default is 0		
SED014	7 phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no	0xFF	
SFD914	Z phase terminal setting	terminal(interruption)	UXFF	
		Bit7~bit0: X terminal of positive		
SFD915	Limit tomainal acting	limit, 0xFF is no terminal	FFFF	
SFD915	Limit terminal setting	Bit15~bit8: X terminal of negative	FFFF	
		limit, 0xFF is no terminal		
GED017	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no	0.55	
SFD917	terminal	terminal	0xFF	
CED010	Returning speed VH low 16		0	
SFD918	bits		0	
CED010	Returning speed VH high 16		0	
SFD919	bits		0	
GED022	Crawling speed VC low 16		0	
SFD922	bits		0	
SFD923	Crawling speed VC high 16		0	
SFD925	bits		0	
SFD924	Mechanical origin position		0	
SFD924	low 16 bits		0	
SFD925	Mechanical origin position		0	
51 D925	high 16 bits		0	
SFD926	Z phase numbers		0	
SFD927	CLR signal delay time	Default 20, unit: ms	20	
SFD928	Grinding wheel radius(polar	Low 16 bits	0	
SFD929	coordinate)	High 16 bits	0	
SFD930	Soft limit positivo limit1	Low 16 bits	0	
SFD931	Soft limit positive limit value	High 16 bits	0	
SFD932	Soft limit negative limit	Low 16 bits	0	1
SFD933	value	High 16 bits	0	1
				1
GED 6 7 0	Pulse default speed low 16		20	G
SFD950	bits		20	Group 1
GED 0.51	Pulse default speed high 16	It will send pulse with default speed	0	1 1
SFD951	bits	when the speed is 0.	0	
GED 6 5 5	Pulse default speed	-	100	1
SFD952	acceleration time		100	

SFD953	Pulse default speed		200	
	deceleration time			4
SFD954	Acceleration and		30	
	deceleration time			4
		Bit 1~0: acc/dec mode		
		00: line	0	
SFD955	Pulse acceleration and	01: S curve		
	deceleration mode	10: sine curve		
		11: reserved		
		Bit 15~2: reserved		_
SFD956	Max speed limit low 16 bits		50	_
SFD957	Max speed limit high 16 bits		0	_
SFD958	Initial speed low 16 bits		0	_
SFD959	Initial speed high 16 bits		0	
SFD960	Stop speed low 16 bits		0	
SFD961	Stop speed high 16 bits		0	
	Follow performance	$1 \sim 100$, 100 means the time constant is	50	
SFD962	parameters	one tick, 1 means the time constant is		
	parameters	100 tick.		
SFD963	Follow feedforward		0	
51 D705	compensation	0~100, percentage		
•••				
SFD970	Pulse default speed low 16 bits		30	Group 2
SFD971	Pulse default speed high 16 bits	It will send pulse with default speed when the speed is 0.	0	02
	Pulse default speed	*		
SFD972	acceleration time		100	
GED 053	Pulse default speed		a	1
SFD973	deceleration time		200	
CED074	Acceleration and		30	1
SFD974	deceleration time			
		Bit 1~0: acc/dec mode		1
		00: line		
CEDO75	Pulse acceleration and	01: S curve	0	
SFD975	deceleration mode	10: sine curve	0	
		11: reserved		
		Bit 15~2: reserved		
SFD976	Max speed limit low 16 bits		50	
SFD977	Max speed limit high 16 bits		0	
SFD978	Initial speed low 16 bits		0	
SFD979	Initial speed high 16 bits		0]
SFD980	Stop speed low 16 bits		0	1

SFD981	Stop speed high 16 bits		0
SFD982	Follow performance parameters	1~100, 100 means the time constant is one tick, 1 means the time constant is 100 tick.	50
SFD983	Follow feedforward compensation	0~100, percentage	0
•••			

Note:

- ※1: As there are many configuration parameters of PLSR, we suggest to use software configuration table to set the parameters.
- *2: if user needs to set each segment pulse frequency and pulse numbers in the HMI, please configure through the configuration table first, then use instruction DMOV in the program to set the registers (S0+N*10+0, S0+N*10+2).

For example:

//HD200 set segment 1 pulse frequency in HM	HD10	HD200	DMOV
//HD202 set segment 1 pulse numbers in HMI	HD12	HD202	DMOV
//HD204 set segment 2 pulse frequency in HM	HD20	HD204	DMOV
//HD206 set segment 2 pulse numbers in HMI	HD22	HD206	DMOV

It can also set pulse frequency and numbers in registers HD10, HD12, HD20, HD22 directly in the HMI.

1-2-3. Variable frequency pulse output [PLSF]

■ Instruction summarization

Variable frequency pulse output instruction.

Variable frequency pulse output [PLSF]							
16-bit	-	32-bit instruction	PLSF				
Execution	Normally open/close coil	Suitable mode	XD, XL (except XD1, XL1)				
condition							
Hardware	-	Software	-				

Operand

Operand	Function	Туре
S0	Pulse frequency	32-bit, double word
S1	System parameters (1 to 4)	32-bit, double word
D	Pulse output terminal	Bit

Suitable soft component

word	Operand		System						Constant	Mod	ule	
		D^*	D^* FD TD [*] CD [*] DX DY DM [*]					DS^*	K/H	D	QD	
	S0	•	•	•	•	•	•	•	•	•		
	S1	•	•							•		
bit												
	0 1		System									
υπ	Operand				Systen	n						
UII	Operand	X	Y	M*	Systen S*		C*	Dnm				

*Note: D means D, HD. TD means TD, HTD. CD means CD, HCD, HSCD, HSD. DM means DM, DHM.

DS means DS, DHS. M means M, HM, SM. S means S, HS. T means T, HT. C means C, HC.

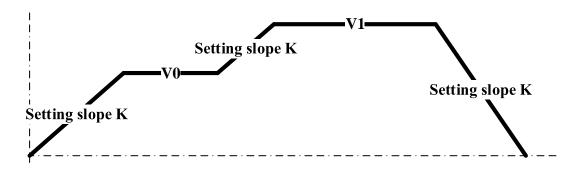
Function and action

Instruction mode:

MO		S0.	S1 .	<u>D.</u>
	PLSF	HD0	K1	Y0
SM1000			-	
	RST	M0		

- Frequency range: 1Hz ~100KHz or -100KHz ~ -1Hz (note: PLC can output 100~200KHz pulse, but we cannot ensure all the servo drive can work fine, please connect 500 Ω resistor between output terminal and 24V power supply)
- When the frequency is positive, it outputs pulse in forward direction, when the frequency is negative, it outputs pulse in reverse direction
- Pulse direction terminal is set in system parameters
- The pulse frequency outputting from Y terminal will change as the S0 value
- HSD0 (double word) is cumulative pulse numbers, HSD2 (double word) is cumulative equivalents
- The frequency jump (acceleration/deceleration) will dynamic adjust as pulse rising or falling slope (refer to chapter 1-2-1-3)
- The system parameters are same to PLSR, refer to chapter 1-2-1-3

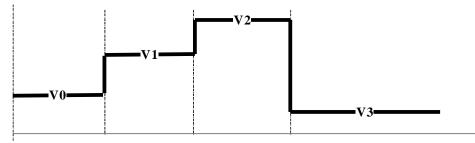
Output mode



- The pulse output terminal is set in system parameters (refer to chapter 6-2-1-3)
- When the frequency is positive, it outputs pulse in forward direction, when the frequency is negative, it outputs pulse in reverse direction
- When S0 is 0, PLSF stop pulse outputting.
- It will dynamic adjust pulse curve according to pulse slope and setting frequency. If the setting frequency is 0, pulse will stop outputting. And it will output pulses when setting frequency is non-zero value.

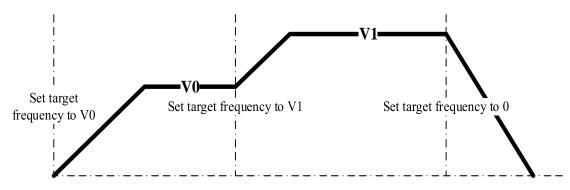


(A) Pulse default speed acceleration deceleration time is 0 The pulse frequency will change as setting frequency.

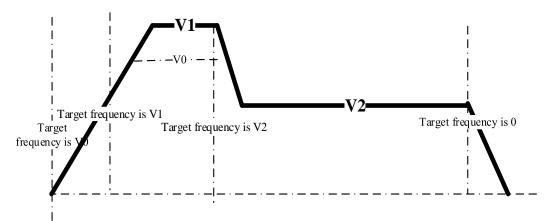


(B) Pulse default speed acceleration deceleration time is not 0

(1) the pulse is in stable segment when user setting new frequency, it will switch to setting frequency through the slope.

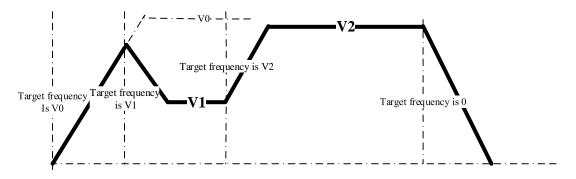


(2) the pulse is not in stable segment when user setting new frequency, it will switch to setting frequency through the slope. (present setting frequency > last time setting frequency, takes present setting frequency as target).



User set target frequency V1 (V1>V0) before reaching setting frequency V0, at this time, it will go to new setting frequency V1 as the slope.

(3) the pulse is not in stable segment when user setting new frequency, it will switch to setting frequency through the slope. (present setting frequency < last time setting frequency, and present setting frequency < present frequency). setting frequency as target).

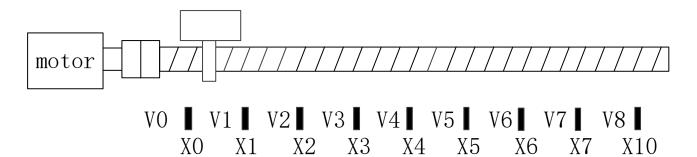


User set target frequency V1 (V1<V0, V1<present frequency) before reaching setting frequency V0, at this time, it will go to new setting frequency V1 as the down slope.

Example 1

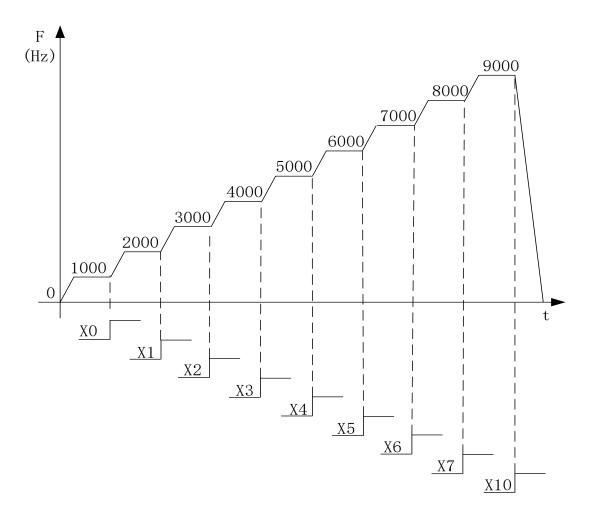
As below diagram, the working table needs to move from left to right position X10. Now the position X0 to X10 all installed proximity switch. The speed from left to X0 is V0, X0 to X1 speed is V1, X1 to X2 speed is V2, X2 to X3 speed is V3, X3 to X4 speed is V4, X4 to X5 speed is V5, X5 to X6 speed is V6, X6 to X7 speed is V7, X7 to X10 speed is V8. Acceleration/deceleration slope is 1000Hz/100ms. Pulse direction terminal is Y2.

No.	Speed name	Speed	No.	Speed name	speed
1	V0	1000Hz	6	V5	6000Hz
2	V1	2000Hz	7	V6	7000Hz
3	V2	3000Hz	8	V7	8000Hz
4	V3	4000Hz	9	V8	9000Hz
5	V4	5000Hz			



Mechanical structure

Pulse curve



Pulse instruction

SM2	,				
		DMOV	K1000	HD0	
M0		1			
	PLSF	HD0	K1	Y0	
X0	ſ				
		DMOV	K2000	HD0	
X1	١	DIGU	***	I ID 0	
		DMOV	K3000	HD0	
X2	[DIGIN	77.4000	WD 0	
		DMOV	K4000	HD0	
X3	[DMOV	K5000	HD0	
[]		DIVIOV	K3000	HD0	
X4 î		DMOV	K6000	HD0	
X5	l	Differ	110000	IID 0	
		DMOV	K7000	HD0	
X6	ſ				
		DMOV	K8000	HD0	
X7	[
[]		DMOV	K9000	HD0	
X10			N	10	
			(]	r)	

- ➢ Software configuration
- (1) Pulse segment configuration

variable frequency output						
Pulse frequence a	ddress: HD0	System params:	K1	Output:	YO	
Pulse frequence(H					Config	
used space:		Read From	PIC Wr	ite To PLC	ок	Cancel
		nead from	11 20		UN	Cancer

(2) System parameter configuration (relative mode)

Value
positive logic
disable
negative
pulse number
Cross coordi
complete
1
1
¥2
10

YO axis-Common-Gear clearance positive compensation YO axis-Common-Gear clearance negative compensation YO axis-Common-Electrical origin position	0 0 0
	0
YO axis-Common-Electrical origin position	
	11
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal

Param	Value
YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0

Param	Value
YO axis-group 1-Pulse default speed	1000
YO axis-group 1-Acceleration time of Pulse default s	100
YO axis-group 1-Deceleration time of pulse default s	100
YO axis-group 1-Acceleration and deceleration time (ms)	0
YO axis-group 1-pulse acc/dec mode	linear acc/dec
YO axis-group 1-Max speed	200000
YO axis-group 1-Initial speed	0
YO axis-group 1-stop speed	0
YO axis-group 1-FOLLOW performance param(1-100)	50
YO axis-group 1-FOLLOW forward compensation(0-100)	0

⁽³⁾ System parameters address:

		Bit 1: pulse direction logic		Cor
		0: positive logic 1: negative logic,		Common parameter
		default is 0		d uc
		Bit 2: use soft limit function		arar
		0: not use 1: use default is 0		nete
		Bit 3: mechanical return to origin		r
		direction		
		0: negative direction 1: positive		
		direction default is 0		
SFD900	Pulse parameter setting	Bit 10~8: pulse unit	0	
		Bit8: 0: pulse number 1: equivalent		
		000: pulse number		
		001: 1 um		
		011: 0.01mm		
		101: 0.1mm		
		111: 1 mm		
		Default is 000		
		Bit15: interpolation coordinate mode		
		0: cross coordinate 1: polar coordinate		
		Default is 0		-
CED 001		Bit 0: pulse sending mode		
SFD901	Pulse sending mode	0: complete mode 1: subsequence		
		mode, default is 0		-
SFD902	Pulse number/1 rotation low		0	
				-
SFD903	Pulse number/1 rotation high		0	
				-
SFD904	Motion quantity/1 rotation		0	
SFD905	Motion quantity/1 rotation		0	
	-			
	Pulse direction terminal	Y terminal no., 0xFF is no terminal	2	
SFD907	Direction delay time	Default is 20, unit: ms	20	-
SFD908	Gear clearance positive		0	
	compensation			
SFD901Pulse sendSFD902Pulse num 16 bitsSFD903Pulse num 16 bitsSFD904Motion of low 16 bitSFD905Motion of high 16 bitSFD906Pulse direct SFD907SFD907Direction compensatSFD908Gear of compensatSFD910Electrical	Ũ		0	
	compensation			
SFD910	Electrical origin low 16 bits		0	
SFD911	Electrical origin high 16 bits		0	

			1	1
		Bit0: origin signal switch state		
		Bit1: Z phase switch state		
		Bit2: positive limit switch state		
SFD912	Signal terminal state setting	Bit3: negative limit switch state	0	
		0: normally open(positive logic)		
		1: normally close(negative logic)		
		default is 0		
SED014	7 phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no	0. EE	
SFD914	Z phase terminal setting	terminal(interruption)	UXFF	
		Bit7~bit0: X terminal of positive		
	T :: 4	limit, 0xFF is no terminal	FFFF	
SFD915	Limit terminal setting	Bit15~bit8: X terminal of negative	FFFF	
		limit, 0xFF is no terminal		
00017	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no		
SFD91/	terminal	terminal	UXFF	
00010	Returning speed VH low 16		0	
SFD918	bits		0	
CED010	Returning speed VH high 16		0	
SFD919	bits		0	
SED022	Crawling speed VC low 16		0	
SFD922 bits Crawling speed VC high 16			0	
SED022	Crawling speed VC high 16		0	
SFD923	bits		0	
SED024	Mechanical origin position		0	
3FD924	low 16 bits		0	
SED025	Mechanical origin position		0	
51 D 9 2 5	high 16 bits		0	
SFD926	Z phase numbers		0	
SFD927	CLR signal delay time	Default 20, unit: ms	20	
SFD928	Grinding wheel radius(polar	Low 16 bits	2	
SFD929	coordinate)	High 16 bits	0	
SFD930	Soft limit positivo limit vol	Low 16 bits	0	
SFD931		High 16 bits	0	
SFD932	Soft limit negative limit	Low 16 bits	0	
SFD933	value	High 16 bits	0	
				1
•••				
CED050	Pulse default speed low 16		1000	G
210320	bits		1000	roup
CED051	Pulse default speed high 16	It will send pulse with default speed	0xFF FFFF 0xFF 0 0 0 0 0 0 0 0 0 20 2 0 0 0 0 1000 0 0 0 0 0 0 0 0 0 0 0 0	
SFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR outperterminalSFD917Clear signal CLR outperterminalSFD918Returning speed VH low bitsSFD919Crawling speed VC low bitsSFD923Crawling speed VC low bitsSFD924Crawling speed VC low bitsSFD925Mechanical origin positi low 16 bitsSFD926Z phase numbersSFD927CLR signal delay timeSFD928Grinding wheel radius(po coordinate)SFD929coordinate)SFD930Soft limit negative limit val SFD931SFD931Soft limit negative limit valueSFD932Soft limit negative limit valueSFD933Pulse default speed low bitsSFD934Pulse default speed low bitsSFD935Pulse default speed low bitsSFD931Pulse default speed low bitsSFD932Pulse default speed low bitsSFD933Pulse default speed low bitsSFD934Pulse default speed low bitsSFD935Pulse default speed low bits	bits	when the speed is 0.	U	
SED052	Pulse default speed	Bit1: Z phase switch state Bit2: positive limit switch state 0 Bit2: positive limit switch state 0 0 Inal setting Bit0~bit7: set X terminal, 0xFF is no terminal (interruption) 0 nal setting Bit7~bit0: X terminal of positive limit, 0xFF is no terminal 0 al CLR output Bit0~bit7: Set X terminal of negative limit, 0xFF is no terminal 0 al CLR output Bit0~bit7: Y terminal, 0xFF is no terminal 0 peed VH low 16 0 0 peed VH low 16 0 0 origin position 0 0 obstitve limit value High 16 bits 0 positive limit value Low 16 bits 0 origin position 0 0 obstitve limit value Low 16 bits 0 high 16 bits 0 0 negative limi	1	
SFD952	acceleration time		100	

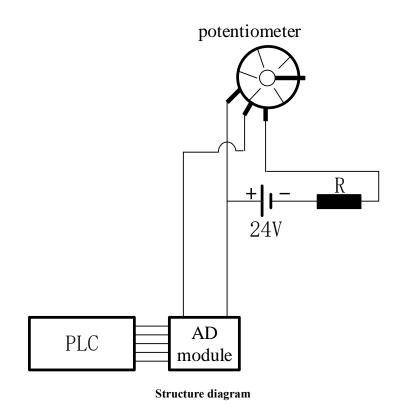
SFD953	Pulse default speed deceleration time		100
SFD954	Acceleration and deceleration time		0
SFD955	Pulse acceleration and deceleration mode	Bit 1~0: acc/dec mode 00: line 01: S curve 10: sine curve 11: reserved Bit 15~2: reserved	0
SFD956	Max speed limit low 16 bits		3392
SFD957	Max speed limit high 16 bits		3
SFD958	Initial speed low 16 bits		0
SFD959	Initial speed high 16 bits		0
SFD960	Stop speed low 16 bits		0
SFD961	Stop speed high 16 bits		0
SFD962	Follow performance parameters	$1 \sim 100$, 100 means the time constant is one tick, 1 means the time constant is 100 tick.	0
SFD963	Follow feedforward compensation	0~100, percentage	0
•••			

Note:

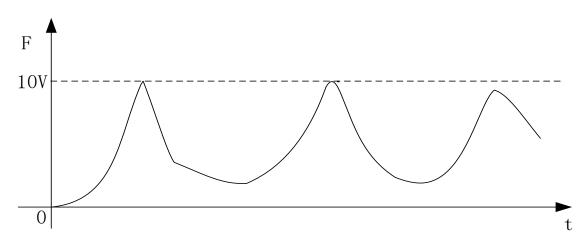
※ 1: As there are many configuration parameters of PLSF, we suggest to use software configuration table to set the parameters.

Example 2

As below diagram, the AD module collects 0-10V voltage signal and transforms to digital value 0-16383, this value will be sent to PLSF pulse frequency register, and PLC will output the pulse curve changing as the voltage signal.

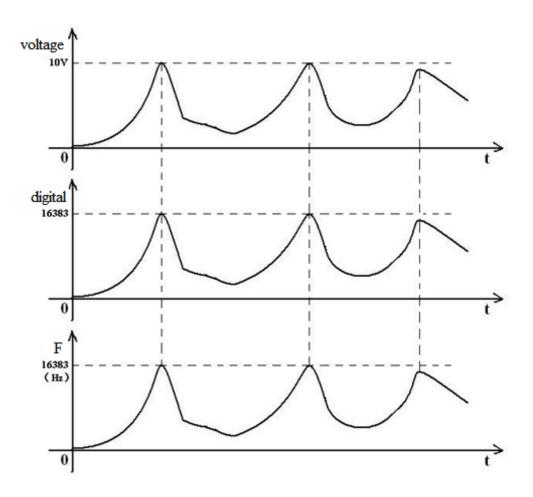


For example: the output signal of potentiometer is shown as below:



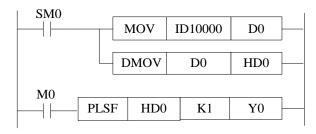
voltage signal diagram

The transformed digital value is 0 to 16383 of 0-10V voltage signal, which means the pulse frequency is $0\sim16383$ Hz (because of the response problem, PLSF acceleration deceleration time is 0). The relationship of voltage signal, digital value and pulse output frequency is shown as below diagram:



Relationship of voltage signal/digital value/pulse frequency

Pulse instruction



- > Software configuration
- (1) Pulse segment configuration

			variable free	quency out	put			×
Γ	Pulse frequence address:	HD0	System params:	K1	Output:	YO		1
L	Pulse frequence(HZ):	0				Config		
l	used space:		Read From	PLC Wri	te To PLC	ОК	Cancel	

ystem parameters (relative mode)	
Param	Value
YO axis-Common-Parameters setting-Pulse direction logic	positive logic
YO axis-Common-Parameters setting-enable soft limit	disable
YO axis-Common-Parameters setting-mechanical back to	negative
YO axis-Common-Parameters setting-Pulse unit	pulse number
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi
YO axis-Common-pulse send mode	complete
YO axis-Common-Pulse num (1)	1
YO axis-Common-Offset (1)	1
YO axis-Common-Pulse direction terminal	¥2
YO axis-Common-Delayed time of pulse direction (ms)	10
	1

(2) System parameters (relative mode)

Param	Value
YO axis-Common-Gear clearance positive compensation	0
YO axis-Common-Gear clearance negative compensation	0
YO axis-Common-Electrical origin position	0
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-signal terminal switch state setting	normally on
YO axis-Common-Far-point signal terminal setting	X no terminal
YO axis-Common-Z phase terminal setting	X no terminal
YO axis-Common-positive limit terminal setting	X no terminal

Param	Value
YO axis-Common-negative limit terminal setting	X no terminal
YO axis-Common-Zero clear CLR output setting	Y no terminal
YO axis-Common-Return speed VH	0
YO axis-Common-Creeping speed VC	0
YO axis-Common-Mechanical zero position	0
YO axis-Common-Z phase num	0
YO axis-Common-CLR signal delayed time (ms)	20
YO axis-Common-grinding wheel radius(polar)	0
YO axis-Common-soft limit positive value	0
YO axis-Common-soft limit negative value	0

Param	Value
YO axis-group 1-Pulse default speed	0
YO axis-group 1-Acceleration time of Pulse default s	0
YO axis-group 1-Deceleration time of pulse default s	0
YO axis-group 1-Acceleration and deceleration time (ms)	0
YO axis-group 1-pulse acc/dec mode	linear acc/dec
YO axis-group 1-Max speed	200000
YO axis-group 1-Initial speed	0
YO axis-group 1-stop speed	0
YO axis-group 1-FOLLOW performance param(1-100)	50
YO axis-group 1-FOLLOW forward compensation(0-100)	0

Note:

 \approx 1: As there are many configuration parameters of PLSF, we suggest to use software configuration table to set the parameters.

1-2-4. Relative single segment positioning [DRVI]

■ Instruction overview

Relative single segment positioning pulse instruction.

Relative sing	gle segment positioning [DRVI]		
16-bit	-	32-bit	DRVI
instruction		instruction	
Execution	Rising/falling edge coil	Suitable	XD, XL (except XD1, XL1)
condition		model	
Hardware	V3.3.1 and up	Software	V3.3 and up

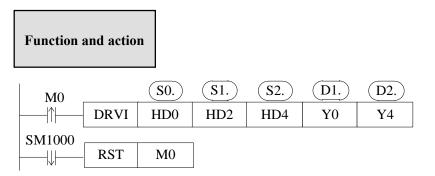
Operand

Operand	Function	Туре
S0	Pulse numbers or soft component address	32-bit, BIN
S 1	Pulse frequency or soft component address	32-bit, BIN
S2	Pulse acceleration/deceleration time or soft	32-bit, BIN
	component address	
D0	Pulse output terminal	Bit
D1	Pulse direction terminal	Bit

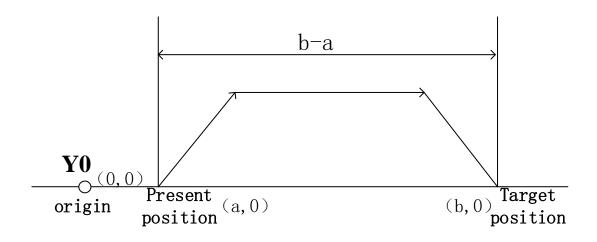
Word	Operand		System								Constant	Modu	le
		D^*	FL) TI) *	CD^*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	•	•	•		•	•	•	•	•	•		
	S 1	•	•	•		•	•	•	•	•	•		
	S2	•	•	•		•	•	•	•	•	•		
	Operand				Syst	em							
Bit		Х	Y	M*	S^*	Τ*	C*	Dn.m					
	D1		•										
	D2		•										

Suitable soft component

*Note: D means D, HD. TD means TD, HTD. CD means CD, HCD, HSCD, HSD. DM means DM, DHM. DS means DS, DHS. M means M, HM, SM. S means S, HS. T means T, HT. C means C, HC.



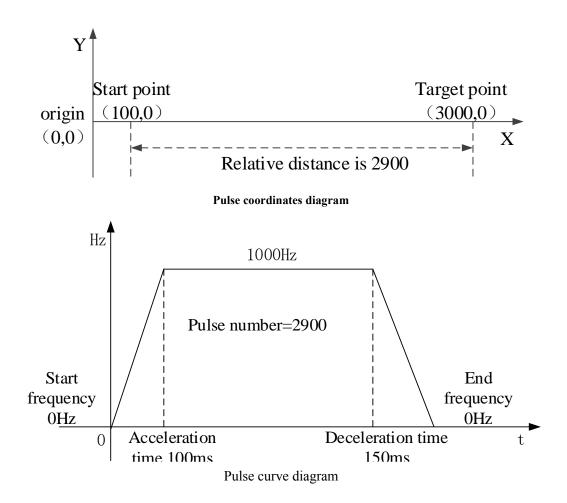
- Pulse frequency output range:1Hz ~100KHz (note: PLC can output 100~200KHz pulse, but we cannot ensure all the servo drive can work fine, please connect 500 Ω resistor between output terminal and 24V power supply)
- Pulse numbers: K-2,147,483,648 ~ K2,147,483,647; negative value means output pulse in reverse direction.
- Relative driving mode: move from the present position (the distance between present position and target position), HSD0, HSD2, HSD4, HSD6..... are the reference point.



- The pulse number is accumulated in register HSD0 (double word).
- The pulse frequency can be real-time changed when the instruction is executing, the new frequency will be effective at once. (PLC firmware v3.4.5 and up can support)
- The acceleration and deceleration time is same for DRVI instruction.
- The direction of relative positioning instruction depends on S0 (pulse number), if the number of pulses is set to a positive value, the pulse is sent in forward direction and the accumulative pulse register (HSD0, HSD4...) value increases; if the number of pulses is set to a negative value, the pulse is sent in reverse direction and the accumulative pulse register (HSD0, HSD4...) value decreases.
- DRVI does not use the system parameter block configuration mode, if the public and the first set of parameters (except the deceleration parameters) are configured, they will be effective for DRVI.

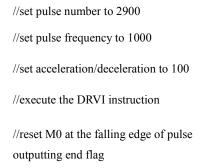
Example 1

X axis present coordinates is (100, 0), it needs to move to target position (3000, 0) with the speed 1000Hz, start frequency and end frequency is 0Hz, pulse output terminal is Y0, direction terminal is Y4. As HSD0(dword) present value is 100, the relative distance from target position 3000 to present position 100 is 3000-100=2900. The execution diagram of DRVI is shown as below:



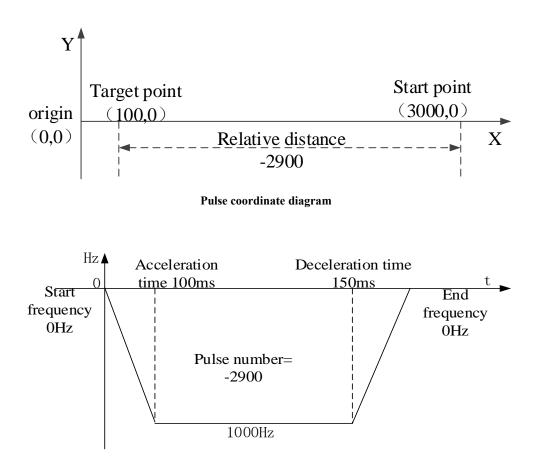
> Program:

SM2		ſ				1
			DMOV	K2900	HD0	
		r				
			DMOV	K1000	HD2	
		l				
			DMOV	K100	HD4	
		l				
M0						-
	HD0	HD2	HD4	Y0	Y4	
SM1000		1			10	_
SM1000				,		
				— (I	K)	



Example 2

X axis present coordinates is (3000, 0), it needs to move to target position (100, 0) with the speed 1000Hz, start frequency and end frequency is 0Hz, pulse output terminal is Y0, direction terminal is Y4. As HSD0(dword) present value is 3000, the relative distance from target position 100 to present position 3000 is 100-3000=-2900. The execution diagram of DRVI is shown as below:



Pulse curve diagram

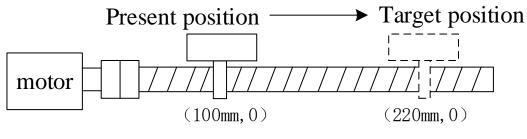
> Program:

SM2			,				_
				DMOV	K-2900	HD0	
				DMOV	K1000	HD2	_]
				DMOV	K100	HD4]—
	DRVI	HD0	HD2	HD4	Y0	Y4]
SM1000					,	10 R)	

//set pulse number to -2900
//set pulse frequency to 1000
//set acceleration/deceleration to 100
//execute the DRVI instruction
//reset M0 at the falling edge of pulse
outputting end flag

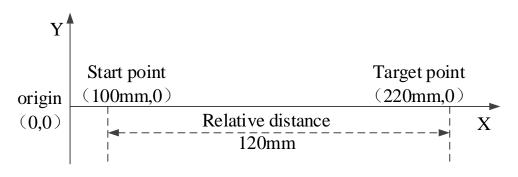
Example 3

There is a ball screw workbench, the motor has 5000 pulses per circle, X axis present coordinate is (100mm, 0), start speed and end speed is 0mm/s, it needs to reach the target position (220mm, 0) with the speed 15000 (30mm/s), the pulse output terminal is Y0, pulse direction terminal is Y4,as the accumulated pulse number register HSD0 present value is 50000 (100mm), the relative distance from target position 110000 (220mm) to present position 50000 (100mm) is 60000=110000-50000. The execution diagram of DRVI is shown as below:

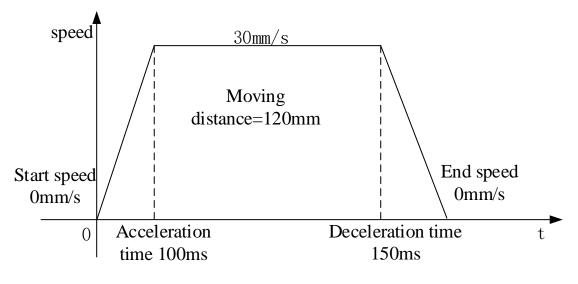


Ball screw pitch: 10mm

Ball srew diagram

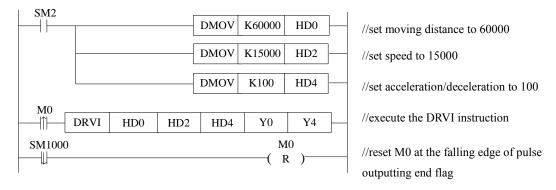


Pulse coordinate diagram



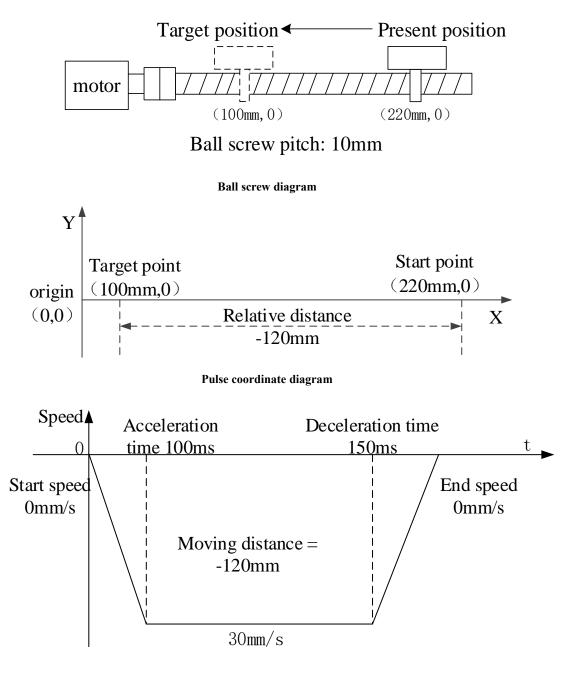
pulse curve diagram

> Program:



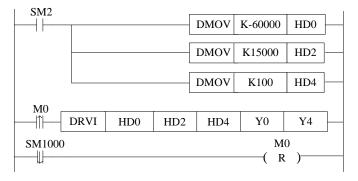
Example 4

There is a ball screw workbench, the motor has 5000 pulses per circle, X axis present coordinate is (220mm, 0), start speed and end speed is 0mm/s, it needs to reach the target position (100mm, 0) with the speed 15000 (30mm/s), the pulse output terminal is Y0, pulse direction terminal is Y4,as the accumulated pulse number register HSD0 present value is 110000 (220mm), the relative distance from target position 50000 (100mm) to present position 110000 (220mm) is -60000=50000-110000. The execution diagram of DRVI is shown as below:



Pulse curve diagram

> Program:



//set moving distance to -60000

//set speed to 15000

//set acceleration/deceleration to 100

//execute the DRVI instruction

//reset M0 at the falling edge of pulse outputting end flag

1-2-5. Absolute single-segment positioning [DRVA]

1. Instruction summarization

Absolute single-segment positioning instruction.

Absolute sin	gle-segment positioning [DRVA]		
16-bit	-	32-bit	DRVA
instruction		instruction	
Execution	Rising/falling edge of the coil	Suitable	XD, XL (except XD1, XL1)
condition		model	
Hardware	V3.3.1 and up	Software	V3.3 and up

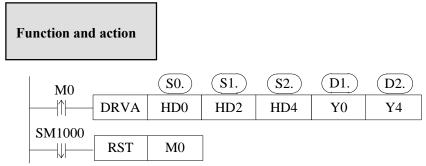
2. operand

Operand	Function	Туре
S0	Output pulse numbers register address	32-bit, BIN
S1	Output pulse frequency register address	32-bit, BIN
S2	Pulse acceleration/deceleration time register	32-bit, BIN
	address	
D0	Pulse output terminal	Bit
D1	Pulse output direction	Bit

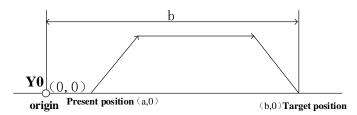
3. Suitable soft component

vord	Operand					Syst	tem				Constant	Mod	lule
		D^*	FD	TD)*	CD^*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	•	•	•		•	•	•	•	•	•		
	S1	•	•	•		•	•	•	•	•	•		
	S2	•	•	•		•	•	•	•	•	•		
Bit	S2 Operand	•	•	•	Sy	• stem	•	•	•	•	•		
Bit		• X		• M*	Sy S*		• C*	• Dnm		•	•		
sit					-	stem				•	•		

*Note: D means D, HD. TD means TD, HTD. CD means CD, HCD, HSCD, HSD. DM means DM, DHM. DS means DS, DHS. M means M, HM, SM. S means S, HS. T means T, HT. C means C, HC.



- Pulse frequency output range:1Hz ~100KHz (note: PLC can output 100~200KHz pulse, but we cannot ensure all the servo drive can work fine, please connect 500Ω resistor between output terminal and 24V power supply)
- Pulse numbers: K-2,147,483,648 ~ K2,147,483,647; negative value means output pulse in reverse direction.
- Absolute driving mode: move from the origin point (the distance between origin position and target position), origin point is the reference point.

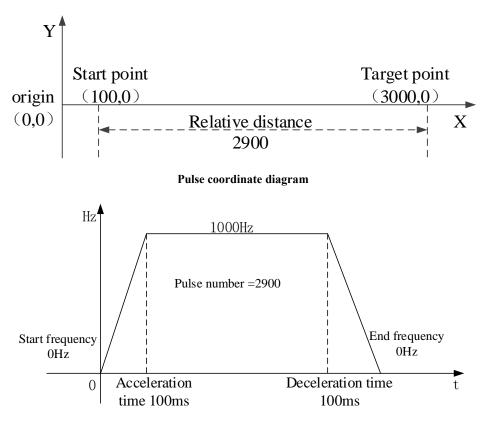


- DRVA does not use the system parameter block configuration mode, if the public and the first set of parameters (except the deceleration parameters) are configured, they will be effective for DRVA.
- The pulse number is accumulated in register HSD0 (double word).
- The pulse frequency can be real-time changed when the instruction is executing, the new frequency will be effective at once. (PLC firmware v3.4.5 and up can support)

- The acceleration and deceleration time is same for DRVA instruction.
- The direction of absolute positioning instruction depends on whether the target position is larger than present position, if the target position is larger than present position(the target position is on the right of present position on the axis), the pulse is sent in forward direction and the accumulative pulse register (HSD0, HSD4...) value increases; if the target position is smaller than present position(the target position is on the left of present position on the axis), the pulse is sent in reverse direction and the accumulative pulse register (HSD0, HSD4...) value decreases, if the target position is equal to present position(the target position overlaps present position on the axis), it will not send pulse.
- When S0 parameters are same to pulse accumulated register HSD0, SM1000 will not act, no falling edge.

Example 1

X axis present coordinates is (100, 0), it needs to move to target position (3000, 0) with the speed 1000Hz, start frequency and end frequency is 0Hz, pulse output terminal is Y0, direction terminal is Y4. As HSD0(dword) present value is 100, the target position is 3000, target position is larger than present position, send forward direction pulse, the execution diagram of DRVA is shown as below:



Pulse curve diagram

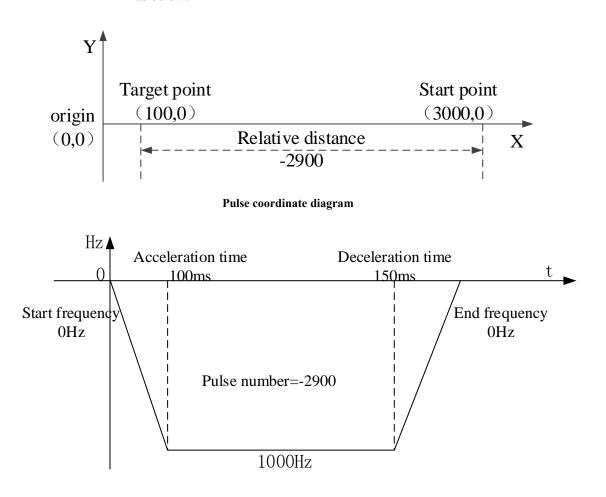
> Program:

SM2		[DMOV	K3000	HD0]—
		[DMOV	K1000	HD2]
		[DMOV	K100	HD4]
M0	HD0	HD2	HD4	Y0	Y4]
SM1000					10 R)	

//set pulse number to 3000
//set pulse frequency to 1000
//set acceleration/deceleration to 100
//execute the DRVA instruction
//reset M0 at the falling edge of pulse
outputting end flag

Example 2

X axis present coordinates is (3000, 0), it needs to move to target position (100, 0) with the speed 1000Hz, start frequency and end frequency is 0Hz, pulse output terminal is Y0, direction terminal is Y4. As HSD0(dword) present value is 3000, the target position is 100, present position is 3000, the relative ditance is 100-3000=-2900, the execution diagram of DRVA is shown as below:



Pulse curve diagram

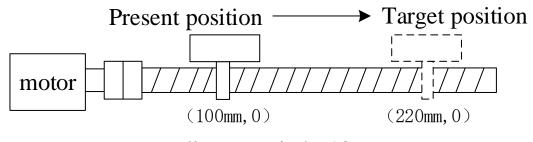
> Program:

SM2		[DMOV	K100	HD0]
		[DMOV	K1000	HD2]——
		[DMOV	K100	HD4]—
M0	HD0	HD2	HD4	Y0	Y4]
SM1000				(H	10 R)	

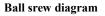
//set pulse number to 100
//set pulse frequency to 1000
//set acceleration/deceleration to 100
//execute the DRVA instruction
//reset M0 at the falling edge of pulse
outputting end flag

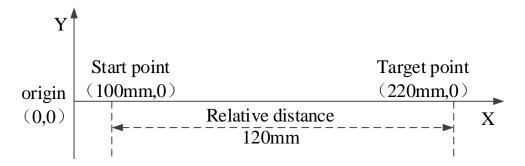
Example 3

There is a ball screw workbench, the motor has 5000 pulses per circle, X axis present coordinate is (100mm, 0), start speed and end speed is 0mm/s, it needs to reach the target position (220mm, 0) with the speed 15000 (30mm/s), the pulse output terminal is Y0, pulse direction terminal is Y4, as the accumulated pulse number register HSD0 present value is 50000 (100mm), the relative distance from target position 110000 (220mm) to present position 50000 (100mm) is 60000=110000-50000. The execution diagram of DRVA is shown as below:

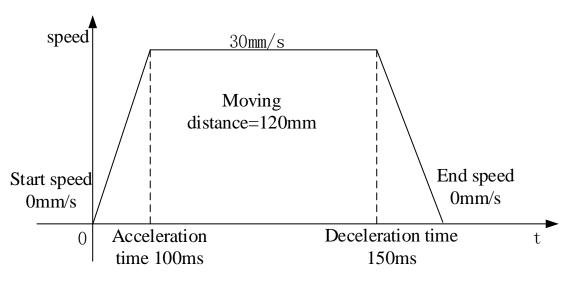


Ball screw pitch: 10mm

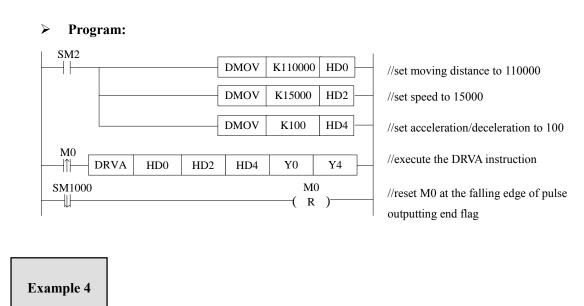




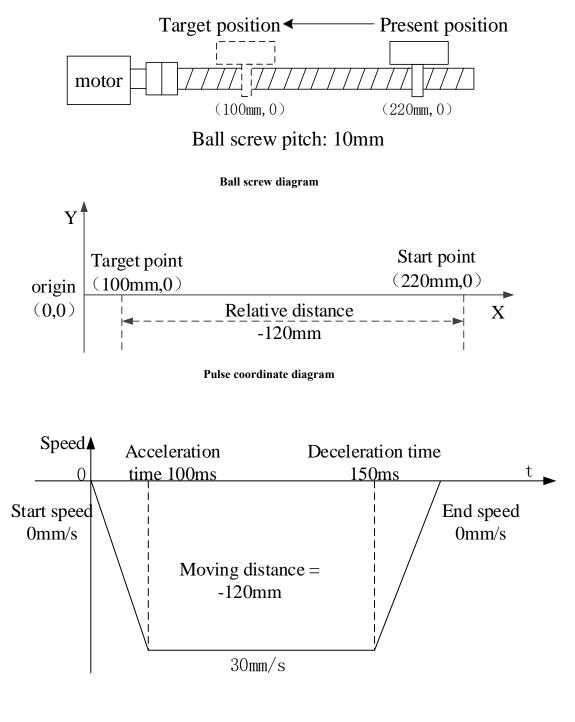
Pulse coordinate diagram



pulse curve diagram



There is a ball screw workbench, the motor has 5000 pulses per circle, X axis present coordinate is (220mm, 0), start speed and end speed is 0mm/s, it needs to reach the target position (100mm, 0) with the speed 15000 (30mm/s), the pulse output terminal is Y0, pulse direction terminal is Y4, as the accumulated pulse number register HSD0 present value is 110000 (220mm), the relative distance from target position 50000 (100mm) to present position 110000 (220mm) is -60000=50000-110000. The execution diagram of DRVA is shown as below:



Pulse curve diagram

> Program:

SM2			-			
				DMOV	K50000	HD0
_			[DMOV	K15000	HD2 —
			[DMOV	K100	HD4 —
M0				-1	1	
	VA	HD0	HD2	HD4	Y0	Y4 —
SM1000					(R)(

//set moving distance to 50000

//set speed to 15000

//set acceleration/deceleration to 100

//execute the DRVA instruction

//reset M0 at the falling edge of pulse outputting end flag

1-2-6. Mechanical origin return[ZRN]

1. Instruction overview

Mechanical origin return instruction. (note: ZRN cannot support the function of soft limit and origin auxiliary signal)

Mechanical	origin return [ZRN]		
16-bit		32-bit	ZRN
instruction		instruction	
Execution	Rising/falling edge of the coil	Suitable	XD, XL (except XD1, XL1)
condition		model	
Hardware	-	Software	-

2. Operand

Operand	Function	Туре
S	System parameter block address	32-bit, double words
D	Pulse output terminal	Bit

3. Suitable soft component

ord	Operand					Syst	em				Constant	Mod	lule
		D^*	FD	TD	* (CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S	•	•	•		•	•	•	•	•	•		
		1										1	11
Bit	Operand				Sys	stem	I	I		I		1	
Bit	Operand	X	Y	M*	Sys S*	stem T*	C*	Dnn	1	1		I	1

*Note: D means D, HD. TD means TD, HTD. CD means CD, HCD, HSCD, HSD. DM means DM, DHM.

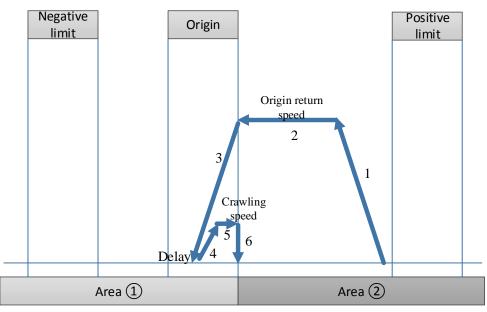
DS means DS, DHS. M means M, HM, SM. S means S, HS. T means T, HT. C means C, HC.

Function a	and action		
MO		S·)	D
	ZRN	K1	Y0

- The system parameter block please refer to chapter 1-2-1-3.
- ZRN instruction panel configuration is shown as below:

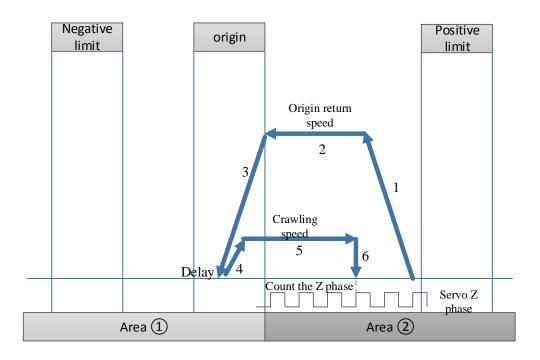
Mechanical	origin re	gression(ZRN) ×
System params:	DO	Output:	Y0
		Pulse	config
		ОК	Cancel

• Mechanical origin returning diagram:



Note:

If setting the servo Z phase, it starts to count the Z phase signal at the monment of leaving the origin signal with crawling speed (5), it stops mechanical origin return instruction after Z phase signal counting reached, please see below diagram:



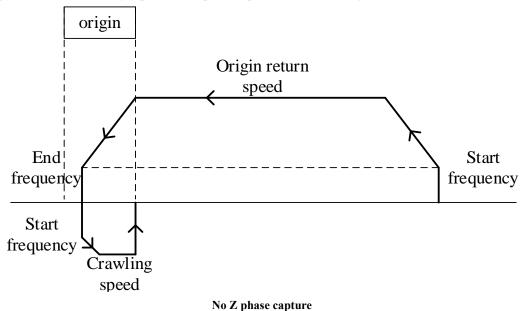
• Mechanical origin return movement

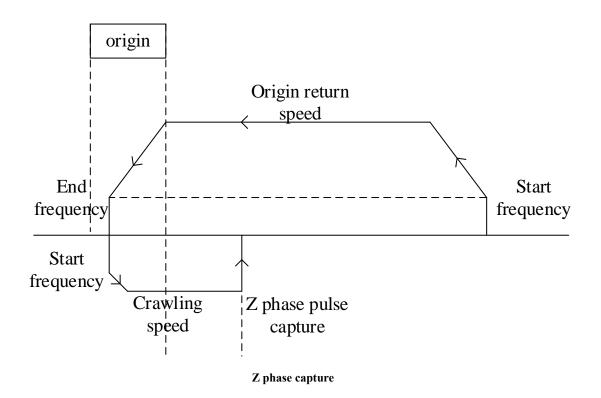
(1) when the origin return starts, it accelerates as the acceleration slope, after reaching the origin return speed, it will move towards origin return direction with this speed.

(2) when it meets the rising edge of origin signal, it will decelerate with deceleration slope until stop(frequency =0).

(3) delay(direction delay time in SFD), then accelerate with acceleration slope until reaching the crawling speed, it stops origin return action at the moment of leaving the origin signal falling edge (if setting the Z phase pulse, it starts counting the Z phase after leaving the origin signal falling edge, it will stop origin return action after the counting value reached).

(4) if setting the origin return clear signal CLR, it will output CLR signal and delay (the CLR signal delay time in SFD, CLR signal can be used to clear the servo motor error counter), finally, copy the mechanical origin position to present position and the origin return action finished.





Mechanical origin input terminal positive/negative logic (normally on/off) setting:

PLC1 - Pulse Set		×
Config 🗸 Delete init axis config guide		
Param SFD912 bit0	Value	^
YO axis-Common-Delayed time of pulse direction (ms)	10	
YO axis-Common-Gear clearance positive compensation	0	
YO axis-Common-Gear clearance negative compensation	0	
YO axis-Common-Electrical origin position	0	
YO axis-Common-signal terminal switch state setting-Far-point	normally	1
YO axis-Common-signal terminal switch state setting-Z phase sw	normally	
YO axis-Common-signal terminal switch state setting-positive 1	normally	
YO axis-Common-signal terminal switch state setting-negative 1	normally	
YO axis-Common-Far-point signal terminal setting	X no ter	-
YO axis-Common-Z phase terminal setting	X no ter	
<		~
Read From PLC Write To PLC OK (Cancel	

Mechanical orgin return setting notes:

The origin signal terminal can select all input points on the PLC; However, if the selected input

point is the external interrupt terminal on the PLC, the process of returning to the mechanical origin will be processed according to the interrupt, so as to further improve the accuracy of returning to the mechanical origin (it will not be affected if Z phase is used to return to the origin). The selected input point is the external interrupt terminal not from the PLC, which will be affected by the scanning cycle of PLC in the process of mechanical origin (it will not be affected if Z phase is used to return to the origin). For detailed external interrupt terminals, please refer to appendix 4 of this manual.

PLC mode	Pulse channel	Pulse output terminal	Max output frequency	Output mode	Output mode
XD2-16T/RT XD2-24T/RT XD2-32T/RT XD2-48T/RT XD2-60T/RT	2	Y0, Y1	0~100KHz	Open collector mode	Pulse + direction
XD3-16T/RT XD3-24T/RT XD3-32T/RT XD3-48T/RT XD3-60T/RT	2	Y0, Y1	0~100KHz	Open collector mode	Pulse + direction
XD5-16T/RT XD5-24T/RT XD5-32T/RT XD5-48T/RT XD5-60T/RT	2	Y0, Y1	0~100KHz	Open collector mode	Pulse + direction
XD5-24T4 XD5-32T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector mode	Pulse + direction
XD5-48T6 XD5-60T6	6	Y0, Y1, Y2, Y3, Y4, Y5	0~100KHz	Open collector mode	Pulse + direction
XDM-24T4 XDM-32T4 XDM-60T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector mode	Pulse + direction
XDM-60T10	10	Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y10, Y11	0~100KHz	Open collector mode	Pulse + direction
XD5E-30T4	4	Y0, Y1, Y2, Y3	0~100KHz	Open collector mode	Pulse + direction
XL3-16	2	Y0, Y1	0~100KHz	Open collector	Pulse + direction

Pulse output terminal configuration table:

mode

Note:

1: PLC can output 100 KHz to 200 KHz pulses, but we cannot sure that all servo is running, please connect 500 Ω resistance between output and 24V power supply.

2. when using the positioning command, the pulse direction terminal can be freely defined in all the output transistor terminals except the pulse output terminal;

3. response time of pulse output transistor is 0.5us, response time of other output transistors is below 0.2ms.

4. when the pulse output terminal does not make the pulse output, it can also be used as the pulse direction terminal.

Mechanical origin returning pulse direction signal:

PLC1 - Pulse Set		H	×
Config 👻 Delete 🛛 init axis 🔷 config guide			
FD906	Value		^
Common-Parameters setting-Pulse unit	pulse number		
Common-Parameters setting-Interpolation coordinates mode	Cross coordi		
Common-pulse send mode	complete mode		
Common-Pulse num (1)	1		
Common-Offset (1)	1		
Common-Pulse direction terminal	Y14	•	
Common-Delayed time of pulse direction (ms)	Y no terminal Y0	^	
Common-Gear clearance positive compensation	Ý1		
Common-Gear clearance negative compensation	Y2 Y3		
Common-Electrical origin position	Y4 Y5		
	Y6 Y7		~
	Y10		
Read From PLC Write To PLC OK	Y11 Y12		

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔷 config guide		
FD900 bit3	Value	^
Common-Parameters setting-Pulse direction logic	positive logi	c
Common-Parameters setting-enable soft limit	disable	
Common-Parameters setting-mechanical back to the origin d	negative	
Common-Parameters setting-Pulse unit	pulse number	
Common-Parameters setting-Interpolation coordinates mode	Cross coordi.	
Common-pulse send mode	complete mode	
Common-Pulse num (1)	1	-
Common-Offset (1)	1	-
Common-Pulse direction terminal	Y no terminal	
Common-Delayed time of pulse direction (ms)	10	-
	-	
Read From PLC Write To PLC OK	Cancel]

Origin direction setting of mechanical origin returning:

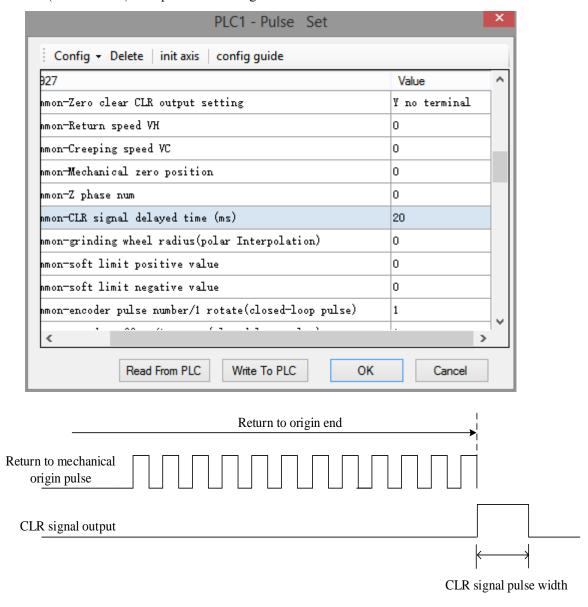
Clear output signal CLR

CLR signal setting, to output an output signal immediately after the end of returning to the mechanical origin, this signal can be sent to some other control equipment to achieve the purpose of rapid information transmission between each other. For example, after returning to the mechanical origin, the CLR signal is output to the servo driver immediately, so as to output clearance signal to clear the Error Counter of the servo motor. At last, copy the mechanical origin position value to the current position and the origin returning action is completed. The parameter configuration table is as follows:

PLC1 - Pulse Set		×
Config 🗸 Delete init axis config guide		
917 bit0-bit7	Value	^
nmon-signal terminal switch state setting positive limi	normally on	
nmon-signal terminal switch state setting negative limi	normally on	
nmon-Far-point signal terminal setting	X no terminal	
nmon-Z phase terminal setting	X no terminal	
nmon-positive limit terminal setting	X no terminal	
nmon-negative limit terminal setting	X no terminal	
nmon-Zero clear CLR output setting	Y no terminal	
nmon-Return speed VH	0	
nmon-Creeping speed VC	0	
nmon-Mechanical zero position	0	
<	-	- ¥
Read From PLC Write To PLC OK	Cancel	

CLR signal delay time:

the pulse width of CLR signal outputting after mechanical origin returning, the unit is ms, range is $0\sim32767$ (default 20ms). The parameter configuration table is as follows:



CLR signal diagram

Note:

1. The CLR signal output terminal should use the output terminal of the PLC.

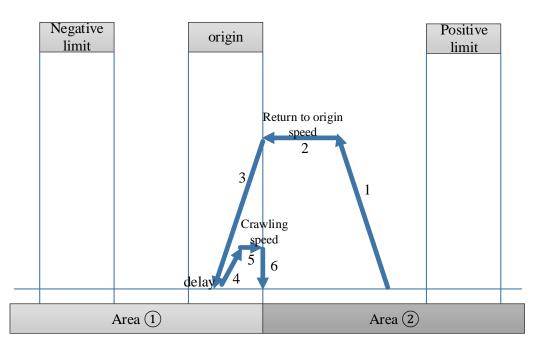
2. Do not set the delay time of CLR signal too small, or the servo driver may be unable to receive the CLR signal.

Motion analysis

1. The table is in area 2 when ZRN instruction started:

When the table is in area 2, it can be subdivided into three situations: the table is between the origin and the positive limit, the table is in the positive limit and the table is out of the positive limit.

(1) The workbench is between origin and positive limit, return to origin in reverse direction



Reverse return to origin

Actions:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and the acceleration is accelerated to the origin regression speed, and then the regression speed of the origin is pushed back toward the mechanical origin direction.

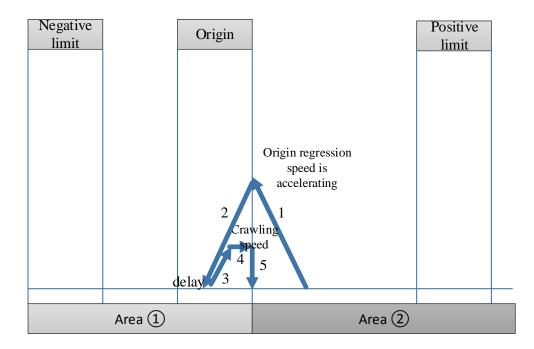
(2) When encountering the rising edge of the mechanical origin signal, slow down with the set deceleration slope until the deceleration to complete rest (frequency =0).

(3) delay (direction delay time in SFD), and then accelerate as the set acceleration slope, move forward until reaching the crawling speed, when leaving the mechanical origin falling edge signal instantaneous stop zero movement (if it sets the Z phase pulse, it starts to count Z phase signal after leaving the origin signal falling edge, then immediately stop motion when the counting reached).

(4) If "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

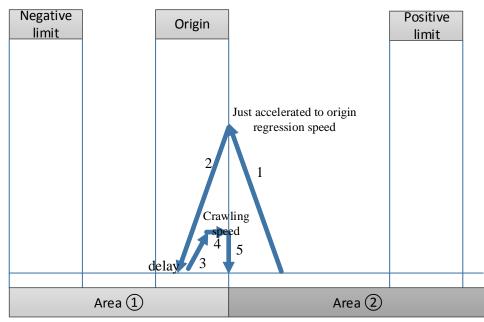
Special case 1:

When the acceleration of the just started ZRN instruction has reached the rising edge of the mechanical origin signal, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); delay (direction delay time in SFD) and then run in reverse direction at low speed as acceleration slope until reach origin regression speed, when leaving the origin falling edge signal instantaneous stop zero movement (if it sets the Z phase pulse, it starts to count Z phase signal after leaving the origin signal falling edge, then immediately stop motion when the counting reached), if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



Special case 2:

When the acceleration of the just started ZRN instruction, it just accelerated to origin regression speed and reached the rising edge of the mechanical origin signal, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); delay (direction delay time in SFD) and then run in reverse direction at low speed as acceleration slope until reach origin regression speed, when leaving the origin falling edge signal instantaneous stop zero movement (if it sets the Z phase pulse, it starts to count Z phase signal after leaving the origin signal falling edge, then immediately stop motion when the counting reached), if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



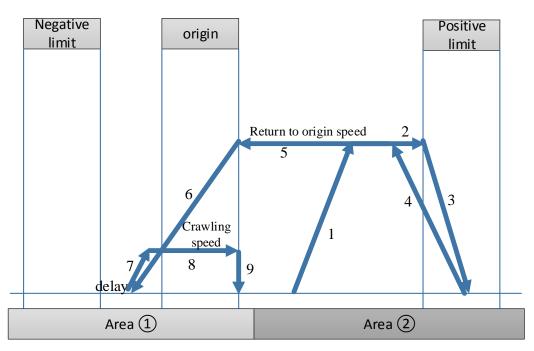
Note:

%1: In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the speed is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate in the same way.

&2: when it sets the servo Z phase pulse, Z phase pulse returning to origin capture function is effective, it will stop the mechanical origin regression in Z phase mode.

 \times 3: If the stopping position falls beyond the negative limit position, it may lead to collision. Please try your best to avoid such situation. This can be done by reducing the set deceleration slope or lengthening the length between the negative limit and the mechanical limit.

(2) workbench is between origin and positive limit, return to origin in forward direction



Return to origin in positive direction

Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and the acceleration is accelerated to the origin regression speed, and then the regression speed of the origin moves toward the positive limit direction.

(2) When encountering the rising edge of the positive limit signal, slow down with the set deceleration slope until the deceleration to complete rest (frequency =0).

(3) Immediately reverse and start accelerating according to the specified acceleration slope until reaching origin regression speed, then the speed begins to recede towards the origin.

(4) when encountering the rising edge of origin signal, slow down with the set deceleration slope until the deceleration to complete rest (frequency =0).

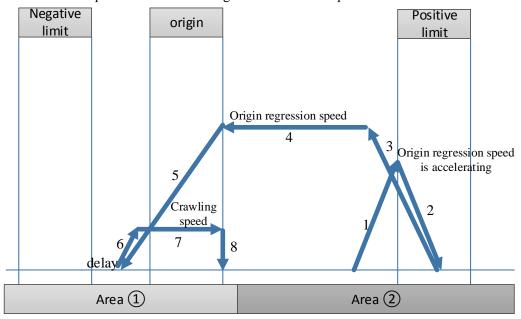
(5) delay (direction delay time in SFD), and then accelerate as the set acceleration slope, move forward until reaching the crawling speed, when leaving the mechanical origin falling edge signal instantaneous stop zero movement (if it sets the Z phase pulse, it starts to count Z phase signal after leaving the origin signal falling edge, then immediately stop motion when the counting reached).

(6) If "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Special case 1:

For the just started ZRN instruction, when accelerating in the positive limit direction and already reached the rising edge of the positive limit signal, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); then accelerate in reverse direction as acceleration slope until reach origin regression speed, then go back in origin direction, when meet the rising edge of origin signal, decelerate as deceleration slope until the

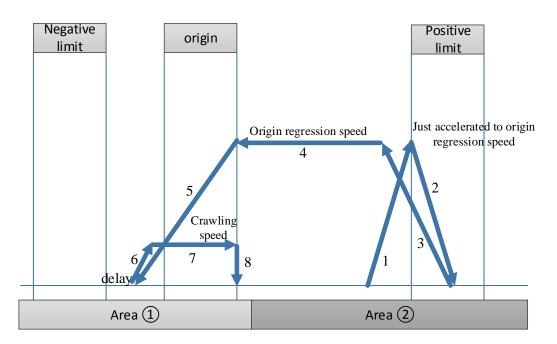
deceleration is completely still (frequency=0). Delay (direction delay time in SFD), low speed slow move in reverse direction with acceleration slope until reaching the origin regression speed, When leaving the origin falling edge signal instantaneous stop pulse outputting (if it sets the Z phase pulse, it starts to count Z phase signal after leaving the origin signal falling edge, then immediately stop zero return motion when the counting reached), if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



Special case 2:

For the just started ZRN instruction, when accelerating to origin regression speed in the positive limit direction and just reached the rising edge of the positive limit signal, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); then accelerate in reverse direction as acceleration slope until reach origin regression speed, then go back in origin direction, when meet the rising edge of origin signal, decelerate as deceleration slope until the deceleration is completely still (frequency=0). Delay (direction delay time in SFD), low speed slow move in reverse direction with acceleration slope until reaching the origin regression speed,

When leaving the origin falling edge signal instantaneous stop pulse outputting (if it sets the Z phase pulse, it starts to count Z phase signal after leaving the origin signal falling edge, then immediately stop zero return motion when the counting reached), if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



Conclusion:

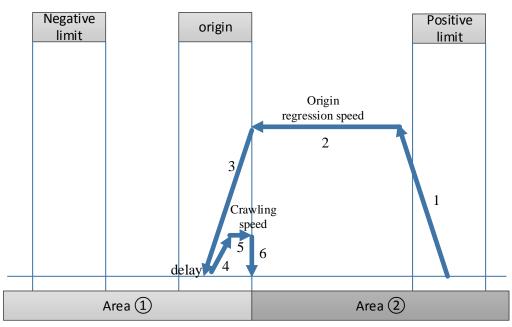
In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touched the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note:

%1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.
%2: When the working table moves towards the positive limit with the speed of returning to the mechanical origin, it will start to decelerate according to the deceleration slope when it encounters the positive limit signal rising edge, and the deceleration stop position may fall on the positive limit or exceed the positive limit; Accidents that can occur when the positive limit is exceeded can be avoided by reducing the deceleration slope or widening the positive limit signal width. If the stopping position falls beyond the negative limit position, it may impact the machine. Please try your best to avoid such situation. This can be done by reducing the set deceleration slope or lengthening the length between the negative limit and the mechanical limit.

(3) Execute origin returning when the workbench is in the positive limit

When the workbench is in the positive limit, return to the origin can only be performed by default in the reverse return to the origin mode, no matter whether the direction of return to the origin is set as forward return to the origin or reverse return to the origin, as shown in the figure below:



In the positive limit and execute origin returning

Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and accelerated to the origin regression speed, and then the regression speed of the origin is withdrawn back to the direction of the origin.

(2) When encountering the rising edge of the origin signal, slow down with the deceleration slope until the deceleration is complete still (frequency =0).

(3) delay (the direction delay time in SFD), accelerate as the acceleration slope until reach the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(4) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Conclusion:

In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touched the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note:

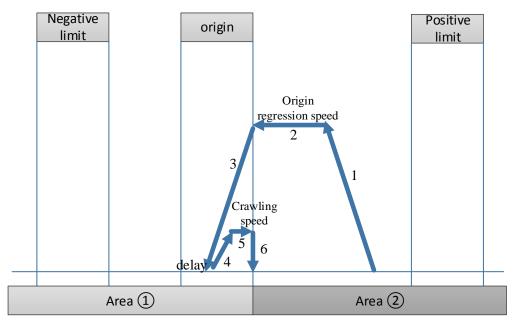
%1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.

 \approx 2: If the stopping position falls beyond the negative limit position, it may impact the machine. Please try your best to avoid such situation. This can be done by reducing the set deceleration slope or lengthening the length between the negative limit and the mechanical limit.

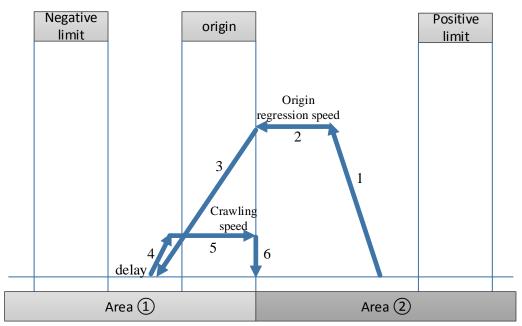
(4) execute the origin returning when workbench exceeds the positive limit

When the working table exceeds the positive limit, in order to prevent the occurrence of machine impact caused by positive return-to-origin, do not execute the return-to-origin. Please move the working table back to the negative(or positive) limit or between the positive limit and the negative limit manually, and then execute the mechanical return-to-origin instruction! The limit switch width of the negative limit and positive limit can also be widened to avoid the occurrence of breaking off the positive limit and negative limit when the pulse deceleration stops.

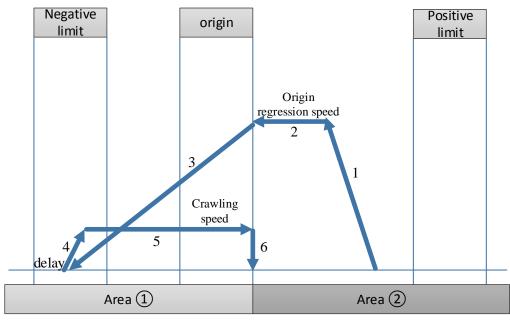
(5) When the table moves back toward the origin with the speed of mechanical return, it will start to slow down according to the set deceleration slope when it touches the rising edge of the mechanical origin. Due to the setting of different speed of mechanical return to the origin and deceleration slope, the final stop position of the table is relatively long, which shall be executed according to the following situations:



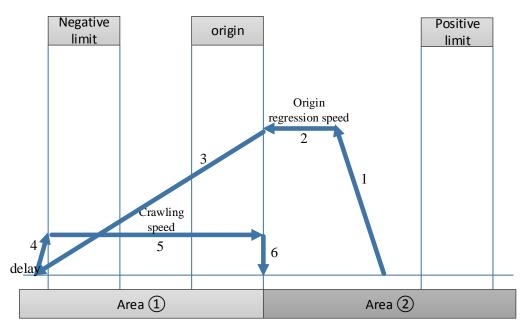
Stop position is on the mechanical origin



Stop position is between mechanical origin and negative limit



Stop position is on the negative limit



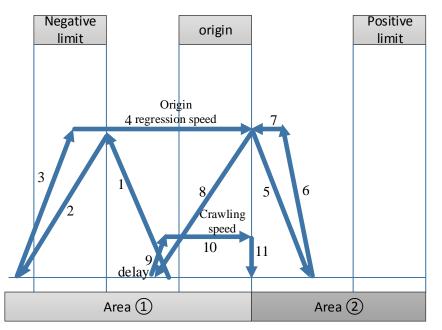
Stop position exceeded negative limit

Note:

※1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.
※2: If the stopping position falls beyond the negative limit position, it may impact the machine. Please try your best to avoid such situation. This can be done by reducing the set deceleration slope or lengthening the length between the negative limit and the mechanical limit.

2. when the mechanical origin returning instruction ZRN starts, the working table is in area (1): When the work table is located in the region, it can be divided into four situations: the work table is between the origin and the negative limit, the work table is at the mechanical origin, the work table is at the negative limit and the work table is beyond the negative limit position.

(1) execute origin regression when the work table is between the origin and negative limit



Execute origin regression in reverse direction

Action:

(1) When the origin regression action starts, the acceleration is carried out first by the set acceleration slope, and then go back in the negative limit direction with the origin regression speed after accelerating to the origin regression speed.

(2) when the work table encounters the rising edge of negative limit with the origin regression speed, it decelerates as the set deceleration slope until stop.

(3) accelerate as the set acceleration slope until reach the origin regression speed, move forward in mechanical origin direction.

(4) When the working table breaks away from the falling edge of the mechanical origin at the speed of mechanical return, it immediately begins to slow down according to the set deceleration slope, until the speed is 0.

(5) The working table immediately accelerates to the speed of returning to the mechanical origin according to the set acceleration slope, and moves back toward the mechanical origin.

(6) When encountering the rising edge of the origin signal, slow down with the deceleration slope until complete still (frequency =0).

(7) delay (the direction delay time in SFD), accelerate as the acceleration slope until reach the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(8) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

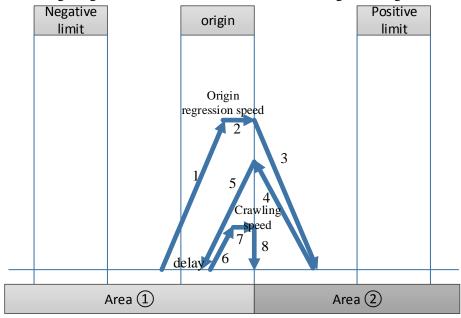
Conclusion:

In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in

the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note:

%1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.
%2: If the stopping position falls beyond the negative limit position, it may impact the machine. Please try your best to avoid such situation. This can be done by reducing the set deceleration slope or lengthening the length between the negative limit and the mechanical limit.



(2) execute the origin regression when the work table is between origin and negative limit

Return to origin in positive direction

Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and then accelerated to the origin regression speed and moved forward in mechanical origin direction.

(2) When the working table breaks away from the falling edge of the mechanical origin at the speed of mechanical return, it immediately begins to slow down according to the set deceleration slope, until the speed is 0.

(3) accelerate as the set acceleration slope until reach the mechanical origin regression speed, go back in mechanical origin direction.

(4) when the work table encounters the rising edge of origin signal, it decelerates as the set deceleration slope until stop (frequency is 0). Delay (the direction delay time in SFD), accelerate as the acceleration slope until reach the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action

at once when the count value reached)

(5) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

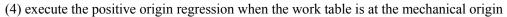
Conclusion:

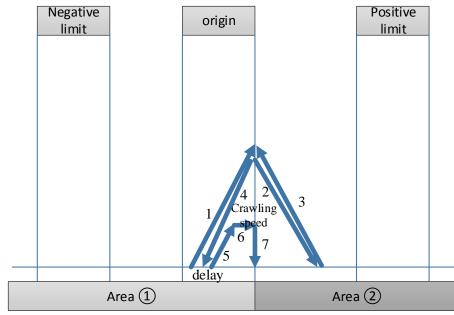
In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note:

%1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode. %2: When the origin returning action is started, the speed shall be accelerated by the set acceleration slope first. No matter whether the speed is accelerated to the speed of mechanical return to the origin, the work table will start to decelerate according to the set deceleration slope as soon as it touches the decline edge of mechanical origin signal.

(3) execute the origin returning when the work table is at the mechanical origin When execute the reverse origin returning and the work table is at the mechanical origin, it will switch to positive origin returning inside, the details please refer to condition (4).





Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and then accelerated to the origin regression speed and moved forward in falling edge of mechanical origin direction.

(2) Whether the table has been accelerated to the speed of the mechanical return to the origin according to the set acceleration slope, it will immediately begin to decelerate according to the set deceleration slope at the descent edge of the mechanical origin until the speed is 0.

(3) The working table immediately starts to accelerate to the speed of returning to the mechanical origin according to the set acceleration slope, and moves back toward the mechanical origin.

(4) Whether the table has been accelerated to the speed of the mechanical return to the origin according to the set acceleration slope, it will immediately begin to decelerate according to the set deceleration slope at the rising edge of the mechanical origin until the speed is 0. Delay (the direction delay time in SFD), accelerate as the acceleration slope until reach the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(5) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Conclusion:

In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

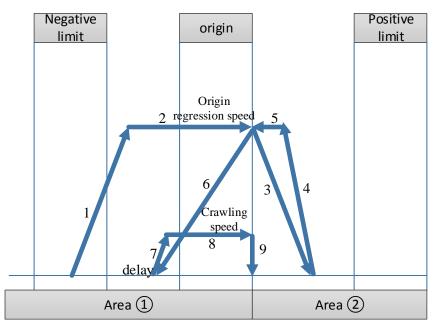
Note:

%1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode. %2: When the origin returning action is started, the speed shall be accelerated by the set acceleration slope first. No matter whether the speed is accelerated to the speed of mechanical

return to the origin, the work table will start to decelerate according to the set deceleration slope as soon as it touches the decline edge of mechanical origin signal.

(5) execute the origin returning when the working table is at the negative limit

When the working table is at the negative limit, whatever the origin returning direction is set to positive or negative, it must execute as defaulted positive direction, shown as below:



Execute origin regression at the negative limit

Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and then accelerated to the origin regression speed and moved forward in origin direction.

(2) When encountering the descent edge of the origin signal, slow down by the deceleration slope until complete rest (frequency =0).

(3) The table starts to accelerate immediately according to the set acceleration slope. Whether it has accelerated to the speed of mechanical return to the origin or not, as long as the table touches the rising edge of mechanical origin signal, it will immediately start to decelerate according to the set deceleration slope.

(4) when the work table decelerated to stop, it started to delay (the direction delay time in SFD), then accelerated as the acceleration slope until reaching the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(5) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Conclusion:

In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.

(6) execute origin returning when the work table exceeded negative limit

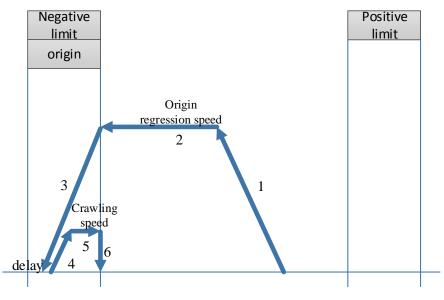
When the working table exceeds the negative limit, in order to prevent the occurrence of machine impact caused by reverse-returning to the origin, please do not go back to the origin. Please move the working table back to the negative or positive limit or between them by manual and then carry out the execution of the mechanical returning to the origin instruction!

The limit switch width of the negative limit and positive limit can also be widened to avoid the occurrence of breaking off the positive limit and negative limit when the pulse deceleration stops.

3. When in consideration of equipment cost or mechanical structure, negative limit switches and mechanical origin switches may need to be used with a proximity switch or travel switch.

First, we set the mechanical origin and negative limit switch in system parameter block as the same input point. When executing the ZRN mechanical return instruction, this input point is used as the mechanical origin. This input point is used as a negative limit when using pulse output commands such as PLSR, PLSF, DRVI, and DRVA.

In view of the position of the work table returning to the mechanical origin, the following will be explained according to the following situations: the work table is between negative limit and positive limit, the work table is in negative limit, the work table is in positive limit, the work table exceeds positive limit position and the work table exceeds negative limit position.



(1) execute reverse origin returning when the work table is between negative limit and positive limit

Return to origin in reverse direction

Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and accelerated to the origin regression speed, and then went back toward the

mechanical origin direction.

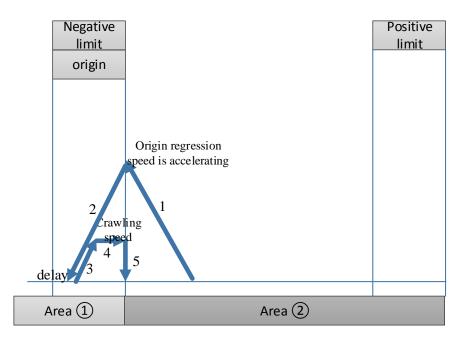
(2) When encountering the rising edge of the origin signal, slow down by the deceleration slope until complete rest (frequency =0).

(3) delay (the direction delay time in SFD), then accelerated as the acceleration slope until reaching the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(4) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Special case 1:

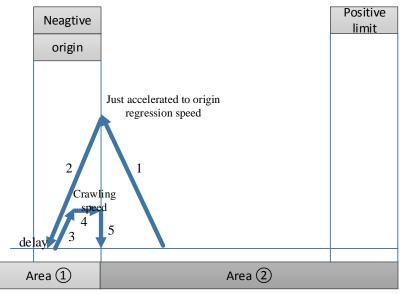
When the acceleration of the just started ZRN instruction has reached the rising edge of the mechanical origin signal, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); delay (the direction delay time in SFD), then reverse move at slow speed as acceleration slope until reach origin regression speed, when at the moment of leaving the origin signal falling edge, if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



Special case 2:

In the acceleration process of the just started ZRN instruction, when it just accelerated to origin regression speed, it reached the rising edge of the mechanical origin signal, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); delay (the direction delay time in SFD), then reverse move at slow speed as acceleration slope until

reach origin regression speed, stop returning action at the moment of leaving the origin signal falling edge (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached), if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



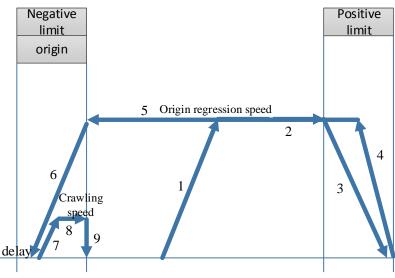
Conclusion:

In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note:

※1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.
※2: If the stopping position falls beyond the negative limit position, it may lead to machine impact. Please try your best to avoid such situation. This can be done by reducing the stated deceleration slope or lengthening the length between the negative limit and the mechanical limit.

(2) execute origin returning in forward direction when the work table is between negative limit and positive limit



Return to origin in positive direction

Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and accelerated to the origin regression speed, and then went forward toward the positive direction of positive limit.

(2) When encountering the rising edge of the origin signal, slow down by the deceleration slope until complete rest (frequency =0).

(3) Immediately reverse and start accelerating according to the specified acceleration slope until reaching the origin regression speed and begins to recede towards the origin.

(4) When encountering the rising edge of the origin signal, slow down by the deceleration slope until complete rest (frequency =0).

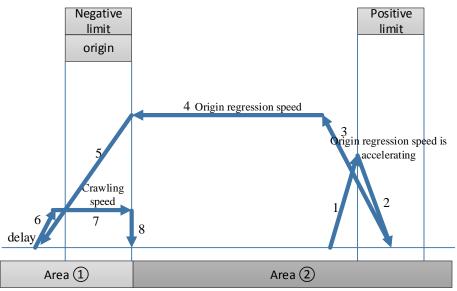
(5) delay (the direction delay time in SFD), then accelerated as the acceleration slope until reaching the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(6) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Special case 1:

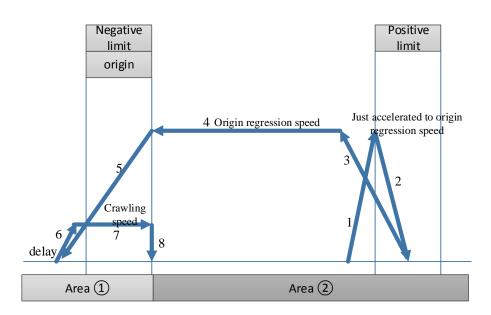
For the just started ZRN instruction, when it has already reached the rising edge of the positive limit signal in the process of accelerating towards positive limit, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); immediately reverse and start accelerating according to the set acceleration slope until reaching the origin regression speed, then start go back, when encountering the rising edge of the origin signal, slow down by the deceleration slope until complete stop (frequency =0); delay(direction delay time in SFD), then reverse move at slow speed as acceleration slope until reach origin regression speed, at

the moment of leaving the origin signal falling edge, stop pulse outputting at once(if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached). If "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



Special case 2:

For the just started ZRN instruction, when it just reached the rising edge of the positive limit signal in the process of accelerating towards positive limit and just accelerated to origin returning speed, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); immediately reverse and start accelerating according to the set acceleration slope until reaching the origin regression speed, then start go back, when encountering the rising edge of the origin signal, slow down by the deceleration slope until complete stop (frequency =0); delay(direction delay time in SFD), then reverse move at slow speed as acceleration slope until reach origin regression speed, at the moment of leaving the origin signal falling edge, stop pulse outputting at once(if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached). If "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.



Conclusion:

In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

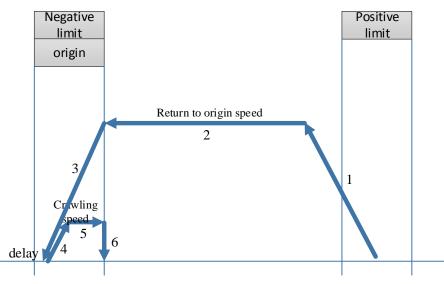
Note:

%1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.
%2: When the working table moves towards the positive limit with the speed of returning to the mechanical origin, it will start to decelerate according to the deceleration slope when it encounters the positive limit signal rising edge, and the deceleration stop position may fall on the positive limit or exceed the positive limit; Accidents that can occur when the positive limit is exceeded, which can be avoided by reducing the deceleration slope or widening the positive limit signal width.

3: If the stopping position falls beyond the negative limit position, it may lead to machine impact. Please try your best to avoid such situation. This can be done by reducing the stated deceleration slope or lengthening the length between the negative limit and the mechanical limit.

(3) execute the origin returning when the work table is in the positive limit

When the work station is in the positive limit, return to the origin can only be performed by default in the reverse return to the origin mode, no matter whether the direction of return to the origin is set as forward return to the origin or reverse return to the origin, as shown in the figure below:



Return to origin in the positive limit

Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, and accelerated to the origin regression speed, and then the regression speed of the origin is withdrawn back towards the direction of the origin.

(2) When encountering the rising edge of the origin signal, slow down by the deceleration slope until complete rest (frequency =0).

(3) delay (the direction delay time in SFD), then accelerated as the acceleration slope until reaching the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(4) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Conclusion:

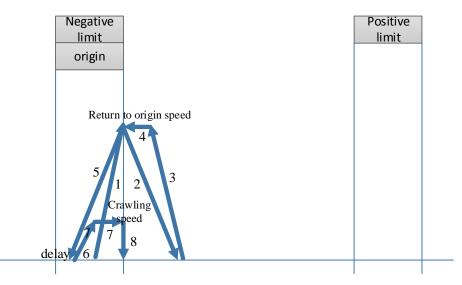
In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note:

%1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode. %2: If the stopping position falls beyond the negative limit position, it may lead to machine

impact. Please try your best to avoid such situation. This can be done by reducing the stated deceleration slope or lengthening the length between the negative limit and the mechanical limit.

(4) execute origin returning when the work table is at the mechanical origin When the worktable is at the mechanical origin, the worktable will return to the origin in positive direction no matter the setting direction is positive or negative, as shown in the figure below:



Action:

(1) When the origin regression action starts, the acceleration is carried out first with the set acceleration slope, after accelerated to the origin regression speed, move forward towards mechanical origin falling edge direction with origin returning speed.

(2) Whether or not the work table has been accelerated to the speed of the mechanical return to the origin according to the set acceleration slope, it will immediately begin to decelerate according to the set deceleration slope when leaving the descent edge of the mechanical origin until the speed acceleration is 0.

(3) The working table immediately starts to accelerate to the speed of returning to the mechanical origin according to the set acceleration slope, and moves back toward the mechanical origin.

(4) whatever the working table has been accelerated to the speed of mechanical return to the origin according to the set acceleration slope, when encountering the rising edge of the origin signal, the deceleration slope is used as the deceleration action until complete rest (frequency =0). Delay (the direction delay time in SFD), then accelerated as the acceleration slope until reaching the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the falling edge of the origin signal, stop zero returning action at once when the count value reached)

(4) if "zeroing clear CLR signal" is set, it will output the clear signal immediately and delay (CLR signal delay time in SFD can be used to clear the Error Counter of the servo motor), At last, copy the mechanical origin position value to the current position and the zeroing action will be completed.

Conclusion:

In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration starts immediately according to the deceleration slope, until the deceleration is 0. Similarly, when the working table described below touches the rising edge of the negative limit (the right edge of the negative limit) and the rising edge of the positive limit (the left edge of the positive limit), please operate them in the same way.

Note:

※1: When the servo Z phase pulse is set, the Z phase pulse back to the origin capture function is effective, and the mechanical return to the origin will be stopped according to the Z phase mode.
※2: When the return operation of the origin is started, it will be accelerated by the set acceleration slope first. No matter the speed is accelerated to the speed of mechanical return to the origin, the work table will start to decelerate according to the set deceleration slope as soon as it touches the decline edge of mechanical origin signal.

 \times 3: When the table starts to accelerate towards the mechanical origin signal, whether it has accelerated to the speed of mechanical return to the origin or not, as long as the table touches the rising edge of the mechanical origin signal, it will immediately start to decelerate according to the set deceleration slope.

(5) execute the origin returning when the work table exceeds the positive limit

When the working table exceeds the positive limit, in order to prevent the occurrence of machine impact caused by positive return-to-origin, do not execute the return-to-origin. Please move the working table back to the negative(positive) limit or between the positive limit and the positive limit manually, and then execute the mechanical return-to-origin instruction!

The limit switch width of the negative limit and positive limit can also be widened to avoid the occurrence of breaking off the positive limit and negative limit when the pulse deceleration stops.

(6) execute the origin returning when the work table exceeds the negative limit

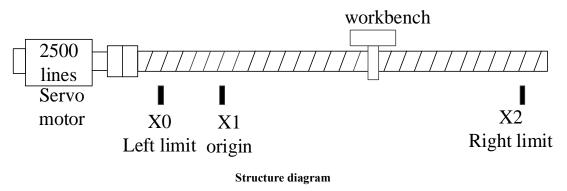
When the working table exceeds the negative limit, in order to prevent the occurrence of machine impact caused by positive return-to-origin, do not execute the return-to-origin. Please move the working table back to the negative(positive) limit or between the positive limit and the positive limit manually, and then execute the mechanical return-to-origin instruction!

The limit switch width of the negative limit and positive limit can also be widened to avoid the occurrence of breaking off the positive limit and negative limit when the pulse deceleration stops.

Example 1

As shown in the diagram below, one servo driver (electronic gear ratio is 1:1 by default) controls one servo motor (encoder 2500 lines), which is connected to the ball screw, whose pitch is 10mm. the ball screw drives workbench which can move right and left. Now the workbench needs to return to the origin, left limit switch connects the PLC input X0 (normally open), the right limit

switch connects the PLC input X2 (normally open), the origin position switch connects the PLC input X1 (normally open), the origin regression speed VH is 10000hz, direction delay time in SFD is 100 ms, crawling speed VC is 100hz, not count the Z phase signal, pulse output port is Y0, direction terminal is Y2, mechanical origin position is set to 0, accelerate slope is 1000hz per 100 ms, The deceleration slope is 1000Hz per 150ms.



> The instruction to return to the mechanical origin

MO			
	ZRN	K1	Y0

System parameter configurations

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Pulse unit	pulse number	
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-Offset (1)	1	
YO axis-Common-Pulse direction terminal	¥2	
YO axis-Common-Delayed time of pulse direction (ms)	10	
YO axis-Common-Gear clearance positive compensation	0	~
Read From PLC Write To PLC OK	Cancel	

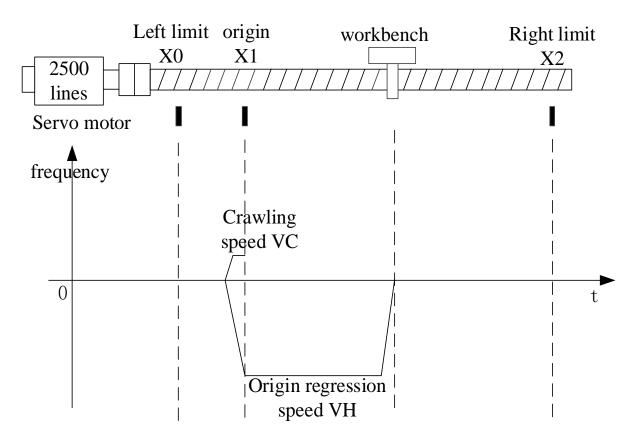
Config 👻 Delete 🛛 init axis 📄 config guide		
Param SFD915 bit8-bit15	Value	
YO axis-Common-Gear clearance positive compensation	0	1
YO axis-Common-Gear clearance negative compensation	0	li
YO axis-Common-Electrical origin position	0	1
YO axis-Common-signal terminal switch state setting	normally on	1
YO axis-Common-signal terminal switch state setting	normally on	1
YO axis-Common-signal terminal switch state setting	normally on	1
YO axis-Common-signal terminal switch state setting	normally on	1
YO axis-Common-Far-point signal terminal setting	X1	1
YO axis-Common-Z phase terminal setting	X no terminal	1
YO axis-Common-positive limit terminal setting	X2	1
YO axis-Common-negative limit terminal setting	XO	1

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD936(dword)	Value	^
YO axis-Common-positive limit terminal setting	Х2	L
YO axis-Common-negative limit terminal setting	хо	L
YO axis-Common-Zero clear CLR output setting	Y no terminal	Ŀ
YO axis-Common-Return speed VH	10000	
YO axis-Common-Creeping speed VC	100	Г
YO axis-Common-Mechanical zero position	0	L
YO axis-Common-Z phase num	0	L
YO axis-Common-CLR signal delayed time (ms)	100	L
YO axis-Common-grinding wheel radius(polar Interpola	0	L
YO axis-Common-soft limit positive value	0	
YO axis-Common-soft limit negative value	0	~
Read From PLC Write To PLC OK	Cancel	1

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Config - Delete init axis config guide		
Param SFD963	Value	1
YO axis-group 1-Pulse default speed	1000	
YO axis-group 1-Acceleration time of Pulse default s	100	
YO axis-group 1-Deceleration time of pulse default s	0	
YO axis-group 1-Acceleration and deceleration time (ms)	150	
YO axis-group 1-pulse acc/dec mode	linear acc/dec	ы
YO axis-group 1-Max speed	200000	Ш
VO axis-group 1-Initial speed	0	Ľ
YO axis-group 1-stop speed	0	Ш
YO axis-group 1-FOLLOW performance param(1-100)	50	L
YO axis-group 1-FOLLOW forward compensation(0-100)	0	
YO axis-group 2-Pulse default speed	0	

> Mechanical origin regression motion diagram

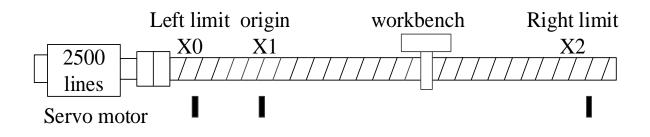


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- in the moment of leaving the falling edge of origin signal X1 with crawling speed, the mechanical origin regression end immediately.
- if origin regression speed, acceleration/deceleration time, and left limit origin position settings are unreasonable, in the deceleration process of touching the origin signal it has already touched left limit, although there are solutions for such special cases inside the software, we try our best to avoid such special cases in the design of the solution. Special circumstances are not explained here.
- Y2 pulse direction terminal always keeps OFF when the workbench is moving from right to left, Y2 is ON when reverse moving with crawling speed until stop.

Example 2

As shown in the diagram below, one servo driver (electronic gear ratio is 1:1 by default) controls one servo motor (encoder 2500 lines), which is connected to the ball screw, whose pitch is 10mm. the ball screw drives workbench which can move right and left. Now the workbench needs to return to the origin, left limit switch connects the PLC input X0 (normally open), the right limit switch connects the PLC input X2 (normally open), the origin position switch connects the PLC input X1 (normally open), the origin regression speed VH is 10000hz, direction delay time in SFD is 100 ms, crawling speed VC is 100hz, count the Z phase signal when reverse leaving the origin signal(connects to PLC input X4), Z phase number is set to 6, pulse output port is Y0, direction terminal is Y2, mechanical origin position is set to 0, accelerate slope is 1000hz per 100 ms, The deceleration slope is 1000Hz per 150ms.



Structure diagram

> The instruction of origin regression



System parameter configurations

×

Config - Delete init axis config guide	
Param SFD963	Value
YO axis-Common-Parameters setting-Pulse direction logic	positive logic
YO axis-Common-Parameters setting-enable soft limit	disable
YO axis-Common-Parameters setting-mechanical back to	negative
YO axis-Common-Parameters setting-Pulse unit	pulse number
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi
YO axis-Common-pulse send mode	complete mode
YO axis-Common-Pulse num (1)	1
YO axis-Common-Offset (1)	1
YO axis-Common-Pulse direction terminal	¥2
YO axis-Common-Delayed time of pulse direction (ms)	10
YO axis-Common-Gear clearance positive compensation	0

PLC1 - Pulse Set

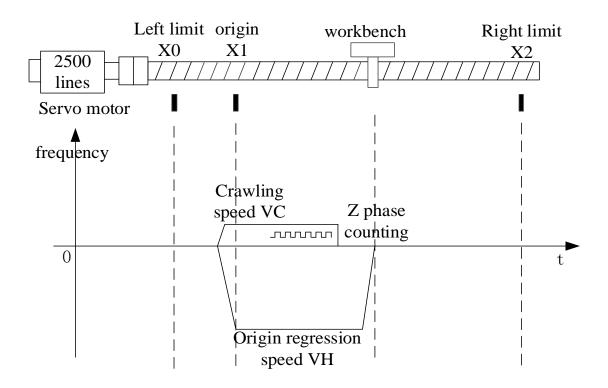
PLCT - Puise Set		
Config 🝷 Delete init axis config guide		
Param SFD914 bit0-bit7	Value	^
YO axis-Common-Gear clearance positive compensation	0	
YO axis-Common-Gear clearance negative compensation	0	
YO axis-Common-Electrical origin position	0	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-Far-point signal terminal setting	X1	
YO axis-Common-Z phase terminal setting	X4	
YO axis-Common-positive limit terminal setting	X2	
YO axis-Common-negative limit terminal setting	XO	v
Read From PLC Write To PLC OK	Cancel	

Config 👻 Delete init axis config guide		
Param SFD927	Value	
YO axis-Common-negative limit terminal setting	хо	
YO axis-Common-Zero clear CLR output setting	Y no terminal	
YO axis-Common-Return speed VH	10000	
YO axis-Common-Creeping speed VC	100	Ш
VO axis-Common-Mechanical zero position	0	Ľ
YO axis-Common-Z phase num	6	Ш
YO axis-Common-CLR signal delayed time (ms)	100	
YO axis=Common=grinding wheel radius(polar Interpola	0	Ш
YO axis-Common-soft limit positive value	0	
YO axis-Common-soft limit negative value	0	
YO axis-Common-encoder pulse number/1 rotate(closed	1000	

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD927	Value	^
YO axis-group 1-Pulse default speed	1000	Ш
YO axis-group 1-Acceleration time of Pulse default s	100	Ш
YO axis-group 1-Deceleration time of pulse default s	0	Ш
YO axis-group 1-Acceleration and deceleration time (ms)	150	Ш
YO axis-group 1-pulse acc/dec mode	linear acc/dec	11
YO axis-group 1-Max speed	200000	Ш
YO axis-group 1-Initial speed	0	11
YO axis-group 1-stop speed	0	Ш
YO axis-group 1-FOLLOW performance param(1-100)	50	Ш
YO axis-group 1-FOLLOW forward compensation(0-100)	0	Ш
YO axis-group 2-Pulse default speed	0	
Read From PLC Write To PLC OK	Cancel	

> Mechanical origin regression motion diagram

I



- When leaving origin signal X1 with crawling speed, count Z phase at once, pulse stop at once when the Z phase counting value reached, the mechanical origin regression end immediately.
- if origin regression speed, acceleration/deceleration time, and left limit origin position settings are unreasonable, in the deceleration process of touching the origin signal it has already touched left limit, although there are solutions for such special cases inside the software, we try our best to avoid such special cases in the design of the solution. Special circumstances are not explained here.
- Y2 pulse direction terminal always keeps OFF when the workbench is moving from right to left, Y2 is ON when reverse moving with crawling speed until stop.

1-2-7. Pulse stop [STOP]

1. deceleration stop pulse outputting

Pulse stop [S	STOP]		
16-bit	STOP	32-bit	-
instruction		instruction	
Execution	Rising edge /falling edge of the	Suitable	XD, XL (except XD1, XL1)
condition	coil	model	
Hardware	-	Software	-

2. Operand

Operand	Function	Туре
S	The terminal to stop the pulse outputting	bit
D	Pulse stop mode (0: stop slowly, 1: scram)	16-bit, word

3. Suitable soft component

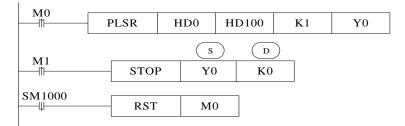
word	operand					Syst	tem				constant	Mod	lule
		D^*	FD	TD)*	CD*	DX	DY	DM*	DS^*	K/H	ID	QD
	D	•	٠	•		•	•	•	•	•			
	it Operand System												
bit	Operand				Sys	tem							
bıt	Operand	X	Y	M*	Sys S*	tem T*	C*	Dnm					

*Note: D means D, HD; TD means TD, HTD; CD means CD, HCD, HSCD, HSD. DM means DM, DHM; DS means DS, DHS.

M means M, HM, SM; S means S, HS; T means T, HT; C means C, HC.

Function and action

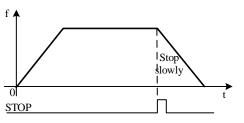
Instruction format



- Pulse stop mode: K0 (stop slowly), K1(scram)
- When M0 is from OFF to ON, PLSR instruction outputs pulse from Y0, and stop pulse outputting when the pulse output numbers reached setting value
- At the rising edge of M1, STOP instruction will stop the pulse outputting of Y0 immediately,

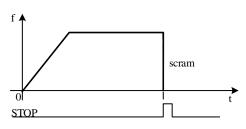
as the D parameter is K0, the pulse will stop slowly.

- Stop pulse includes PLSR, PLSF, DRVI, DRVA, ZRN.
- Stop slowly (K0)



According to the descending slope, the current pulse frequency of the pulse falls to the pulse stop frequency or the number of pulses in the pulse section is all sent out and stop the pulse output.

• Scram (K1)



Stop the pulse outputting immediately.

1-2-8. Pulse continue [GOON]

1. Instruction overview

Continue the pulse output.

Pulse continue [GOON]							
16-bit	GOON	32-bit	-				
instruction		instruction					
Execution	Rising/falling edge of the coil	Suitable	XD, XL (except XD1, XL1)				
condition		model					
Hardware	-	Software	-				

2. Operand

Operand	Function	Туре
S	The terminal to continue outputting the pulse	bit

3. Suitable soft component

Bit	Operand				Sys	tem		
DR		Х	Y	M*	S *	Τ*	C*	Dnm
	S		٠					

*Note: D means D, HD; TD means TD, HTD; CD means CD, HCD, HSCD, HSD. DM means DM, DHM; DS means DS, DHS.

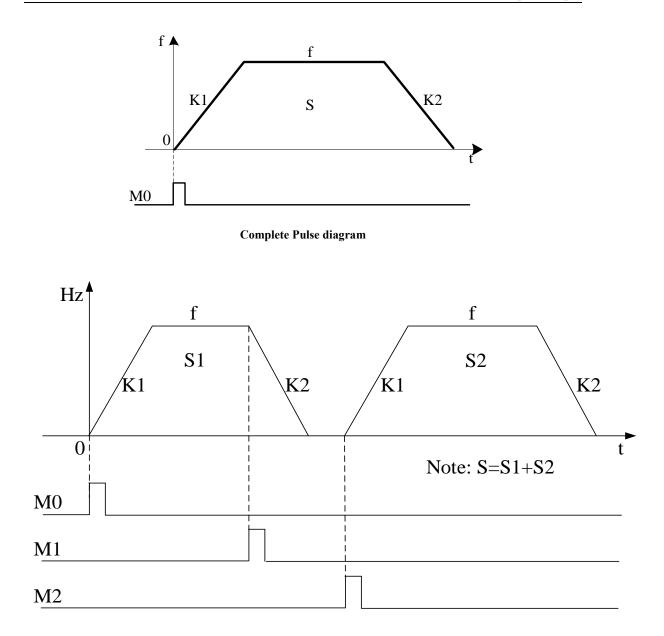
M means M, HM, SM; S means S, HS; T means T, HT; C means C, HC.

Function and action

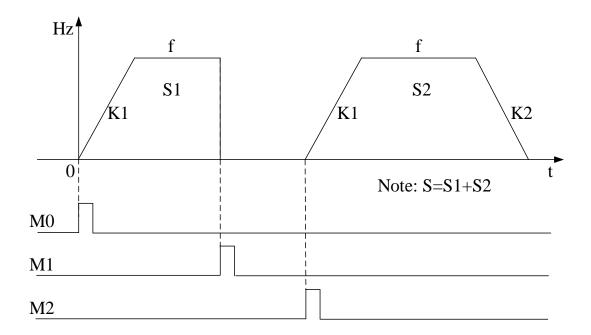
Instruction format

	PLSR	HD0	HD100	K1	Y0
	STOP	Y0	K0		
M2		S.			
	GOON	Y0			
SM1000	RST	M0			

- When M0 from OFF to ON, PLSR instruction outputs pulse from Y0; When the number of output pulses reaches the set value, stop the output pulse.
- In the process of sending pulse, M1 from OFF to ON rising edge, STOP instruction immediately stop Y0 pulse outputting, as the parameter is K0, so the pulse will stop slowly;
- when M2 from OFF to ON rising edge, GOON Y0 instruction is executed, remaining pulses will send out according to the original deceleration slope.
- Please set ON M2 after pulse stop, otherwise GOON will not send pulse.
- Pulse continue instruction is applicable to the PLSR, DRVI, DRVA instructions.
- The schematic diagram is as follows:



Pulse continue wave diagram (STOP Y0 K0)



Pulse continue wave diagram (STOP Y0 K1)

1-3. Pulse parameter configuration wizard

Pulse parameter configuration wizard function was added in V3.3.2 and higher version software. Because there are many system parameters of the pulse axis (including common parameters and the first to fourth sets of parameters), it may be difficult for novices. To solve this problem, a pulse parameter configuration wizard is added to the latest PC software, which configures the pulse parameters of each pulse axis directly through the pulse parameter configuration wizard, which is simple and convenient.

1-3-1. Pulse Parameter Configuration Wizard Opening Mode

On the top of the pulse parameter configuration interface, there is a "Config guide" option. Click on the "Configuration Wizard" to open the pulse parameter configuration wizard. As shown in the figure:

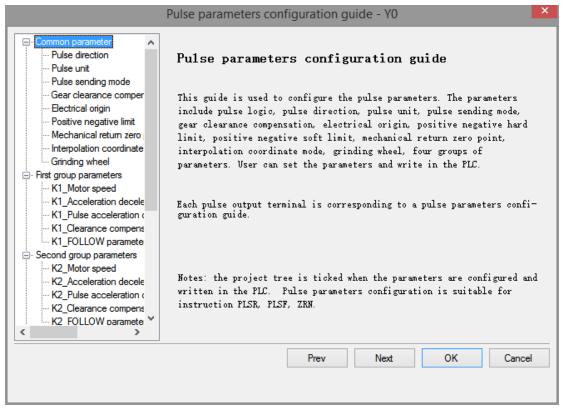
PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔍 config guide		
Param SFD900 bit 1	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	Ľ
YO axis-Common-Parameters setting-mechanical back to	negative	L
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	L
YO axis-Common-Parameters setting-Pulse unit	pulse number	L
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	L
YO axis-Common-pulse send mode	complete mode	L
YO axis-Common-Pulse num (1)	1	L
YO axis-Common-Offset (1)	1	
YO axis-Common-Pulse direction terminal	Y no terminal	L
YO axis-Common-Delayed time of pulse direction (ms)	10	
Read From PLC Write To PLC OK	Cancel]

Engineering Tree is on the left of the following window. You can select the option you want to open in the Engineering Tree, and click directly to open it quickly. As shown in the figure:

	Pulse parameters configuration guide - Y0	×
Common parameter Pulse direction Pulse unit Pulse vitt Pulse sending mode Gear clearance comper Electrical origin Positive negative limit Mechanical retum zero Interpolation coordinate Grinding wheel First group parameters K1_Motor speed K1_Acceleration decele K1_Pulse acceleration (K1_Clearance compens K1_FOLLOW paramete Second group parameters K2_Acceleration decele K2_Pulse acceleration (K2_Clearance compens K2_FOLLOW paramete K4_FOLLOW pa	Pulse parameters configuration guide This guide is used to configure the pulse parameters. The parameters include pulse logic, pulse direction, pulse unit, pulse sending mode, gear clearance compensation, electrical origin, positive negative hard limit, positive negative soft limit, mechanical return zero point, interpolation coordinate mode, grinding wheel, four groups of parameters. User can set the parameters and write in the PLC. Each pulse output terminal is corresponding to a pulse parameters confi- guration guide. Notes: the project tree is ticked when the parameters are configured and written in the PLC. Pulse parameters configuration is suitable for instruction PLSR, PLSF, ZRN.	
	Prev Next OK Cancel	

1-3-2. Instructions for the Use of the Pulse Parameter Config guide

The pulse parameter config guide describes:



This interface is mainly used to briefly explain the pulse parameter configuration wizard.

★ Common parameter—pulse direction

It is used to set the pulse direction logic, the pulse direction terminal and the delay time of the pulse direction.

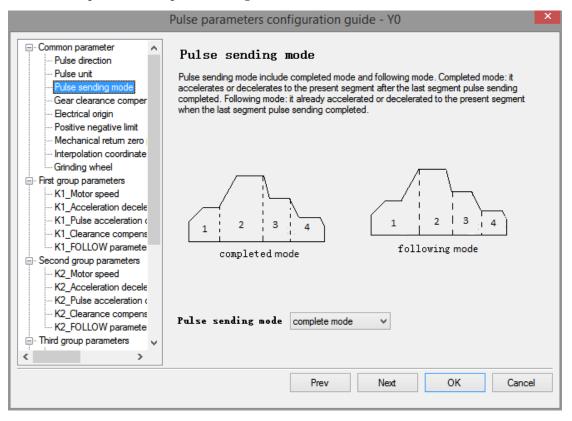
	Pulse parameters configuration guide - Y0	×
Common parameter Pulse direction Pulse unit Pulse sending mode Gear clearance comper Electrical origin Positive negative limit Mechanical return zero Interpolation coordinate	Pulse direction XD series PLC pulse output mode is pulse + direction (open collector). If the pulse direction is positive logic, the motor will run forward when pulse direction signal has output, the motor will run reverse when the direction signal has no output. If the pulse direction is negative logic, the motor will run forward when pulse direction signal has no output, the motor will run reverse when the direction signal has output.	I
	Pulse direction logic positive logic v The pulse direction terminal is high-speed optocoupler (response time below 5µs), others are normal optocoupler (response time below 0.2ms). Please do not use normal optocoupler (relation output the pulse direction signal. Pulse direction terminal Y no termina Y no termina Y	
Second group parameters K2_Motor speed K2_Acceleration decele K2_Pulse acceleration (K2_Clearance compens K2_FOLLOW paramete Third group parameters	When sending positive direction pulse, set ON the pulse direction terminal firstly, the pulse wi output after delay time; when sending negative direction pulse, reset the pulse direction terminal firstly, the pulse will output after delay time. This delay time is pulse direction delay tim (ms).	
< >>	Pulse direction delay time 10 ms Prev Next OK Cancel	

★ common parameters—pulse unit

It is used to set the unit of pulse, the basic unit of equivalent, the number of pulses and the amount of movement.

	Pulse parameters configuration guide - Y0
Common parameter Pulse direction Pulse unit Pulse sending mode	Pulse unit
Gear clearance comper Electrical origin Positive negative limit Mechanical return zero	pulse number, all the parameters are operated as pulse number; when pulse unit is equivalent, all the parameters are operated as equivalent.
Interpolation coordinate Grinding wheel First group parameters Wt1_Motor speed Wt1_Acceleration decele	Pulse unit options
K1_Pulse acceleration (W1_Clearance compens W1_FOLLOW paramete	Basic unit of equive
Second group parameters K2_Motor speed K2_Acceleration decele K2_Pulse acceleration (K2_Clearance compens K2_FOLLOW paramete	The pulse numbers of motor turning one circle 1 Pulse Working table moving distance of motor turning one circle
Third group parameters	Prev Next OK Cancel

★ Common parameters—pulse sending mode



★ Common parameters—gear clearance compensation

It is used for setting forward compensation of gear clearance and reverse compensation of gear clearance.

	Pulse parameters configuration guide - Y0
Common parameter Pulse direction Pulse unit Pulse sending mode Gear clearance comper Electrical origin Positive negative limit Mechanical return zero Interpolation coordinate Grinding wheel First group parameters K1_Motor speed K1_Acceleration decele K1_Pulse acceleration (K1_Clearance compens K1_FOLLOW parameters K2_Acceleration decele K2_Pulse acceleration (K2_Clearance compens K2_FOLLOW parameters K2_PULOW parameters K2_FOLLOW parameters K2_Clearance compens K2_Clearance compens K2_FOLLOW parameters K2_Clearance compens K2_FOLLOW parameters K2_Clearance compens K2_Clearance compens K2_FOLLOW parameters K2_Clearance compens K2_Clearance compens K2_Clearance compens K2_FOLLOW parameters K2_Clearance compens K2_Clearance compens K3_Clearance compens K3_Clearance compens K3_Clearance compens K3_Clearance compens K4_Clearance comp	Gear clearance compensation there is clearance between working table and ball screw. When the working table switched from reverse to forward moving, the forward ditance is less than setting distance. In order to delete this distance error, please use gear clearance positive compensation] there is clearance between working table and ball screw. When the working table switched from forward to reverse moving, the reverse ditance is less than setting distance. In order to delete this distance error, please use gear clearance negative compensation] there is clearance provide to reverse moving, the reverse ditance is less than setting distance. In order to delete this distance error, please use gear clearance negative compensation.
	Prev Next OK Cancel

★ Common parameters —electric origin

	Pulse parameters configuration guide - Y0	×
Common parameter Pulse direction Pulse unit	Electrical origin	
Pulse sending mode Gear clearance comper <mark>Electrical origin</mark>	This function is not available.	
Positive negative limit Mechanical return zero Interpolation coordinate		
Grinding wheel		
─ First group parameters		
K1_Acceleration decele K1_Pulse acceleration (
K1_Clearance compens K1_FOLLOW paramete		
Second group parameters With the second group parameters With the second group parameters		
K2_Acceleration decele		
···· K2_Pulse acceleration (···· K2_Clearance compens ···· K2_FOLLOW paramete		
🖃 Third group parameters 🗸		
< >		
	Prev Next OK Cancel	

★ Common parameters—positive neagtive hard/soft limit

Used for setting positive and negative hard limit and positive and negative soft limit.

	Pulse parameters configuration guide - Y0
Common parameter Pulse direction Pulse unit Pulse sending mode Gear clearance comper Bectrical origin Positive negative limit Mechanical return zero Interpolation coordinate Grinding wheel First group parameters K1_Motor speed K1_Acceleration decele K1_Pulse acceleration c K1_Clearance compens K1_FOLLOW parameter Second group parameters K2_Motor speed K2_Acceleration decele K2_Pulse acceleration c K2_Clearance compens	Pulse parameters configuration guide - Y0 Positive negative hard/soft limit The protection terminal is installed at the both ends of the trip (travel switch) to prevent the working table from moving out of the trip. It can used to search the origin signal when returning origin and protect machine, other pulse instructions are used to check trip limit and protect the device. This function is suitable for PLSR, PLSF, DRVI, DRVA, ZRN, interpolation instructions. positive hard limit switch state normally v terminal X no terr v negative hard limit switch state normally v terminal X no terr v To prevent the working table from moving out of the trip, it uses present pulse accumulated register to judge and protect the device. Note: positive negative soft limit and hard limit can be used at the same time. Use the positive negative soft limit? v Positive soft limit value 0
K2_Gealance comparis K2_FOLLOW paramete Third group parameters	negative soft limit value 0 Note: this parameter will change as the pulse unit.
	Prev Next OK Cancel

★ Common parameters—Mechanical Zero Return Setting

Used to set the default direction of mechanical zero return, origin switch, Z phase switch, regression speed, CLR signal, mechanical origin position.

Pulse parameters configuration guide - Y0			×
Common parameter Pulse direction	Mechanical returning zero		
Pulse unit Pulse sending mode	1.1.Mechanical returning zero default direction	negative V	
Gear clearance comper Electrical origin	2.Origin switch state	normally on $\ \lor$	
Positive negative limit	3. origin signal terminal	X no termin; \vee	
Mechanical return zero Interpolation coordinate	4. Returning speed VH	1000	
Grinding wheel	5. crawling speed VC	100	
···· K1_Motor speed ···· K1_Acceleration decele	6.Mechanical origin position	0	
K1_Pulse acceleration K1_Clearance compens	7.Z phase switch state	normally on $\ \lor$	
K1_FOLLOW paramete	8.Z phase signal terminal	X no termin; 👻	
K2_Motor speed K2_Acceleration decele	9.Z phase pulse numbers	0	
	10.CLR signal delay time	20	
K2_FOLLOW paramete	11.CLR signal terminal	Y no termin; \vee	
	Note: this parameter will change as the pulse unit.		
	Prev Next OK	Cancel	

- ★ Common parameters —Interpolation coordinate mode
- ★ Common parameters —grinding wheel radius

The functions are not avaliable.

★ First group parameter setting

Pulse parameters configuration guide - Y0	×
Common parameter Pulse direction Pulse direction Pulse unit Pulse unit Pulse unit Pulse sending mode Gear clearance comper Electrical origin Positive negative limit Mechanical return zero Interpolation coordinate Grinding wheel First group parameters K1_Motor speed K1_Acceleration decele K2_Notor speed K2_Acceleration decele K2_Acceleration decele K2_Acceleration decele K2_Clearance compens K2_FOLLOW parameter Third group parameters K2_FOLLOW parameter K2_Clearance compens K2_FOLLOW parameter K2_Notor speed K2_Acceleration K2_Clearance K2_Notor speed K3_Acceleration K3_Clearance K3_Not K3_	
	1

★ First group parameters—motor speed

Used to set the maximum speed, starting speed, termination speed.

	Pulse parameters configuration guide - Y0
Common parameter Pulse direction Pulse unit Pulse sending mode Gear clearance comper Electrical origin Positive negative limit Mechanical return zero Interpolation coordinate Grinding wheel	First group of parameter – motor speed [max speed]: all the pulse instructions in the program which executing the first group of parameter cannot over the max speed. If it is larger than the max speed, it will execute as the max speed. [stat speed] and [end speed] is pulse startup frequency and end frequency. Generally, the start speed and end speed is 0. For some special conditions, the pulse needs to accelerate(decelerate) from nonzero speed, the speed is nonzero when the pulse finished.
First group parameters K1_Motor speed K1_Acceleration decele K1_Pulse acceleration decele K1_Pulse acceleration decele K1_Clearance compens K1_FOLLOW parameters K2_Motor speed K2_Acceleration decele K2_Pulse acceleration decele K2_Pulse acceleration decele K2_FOLLOW paramete K2_FOLLOW paramete Third group parameters V	Max speed 100000 Start speed 0 end speed 0 Note: the unit of max speed will change as the pulse unit. When the pulse unit is equivalent, the transformed pulse frequency maybe too large and over the max frequency. XD series PLC max pulse output frequency is 200KHz.
	Prev Next OK Cancel

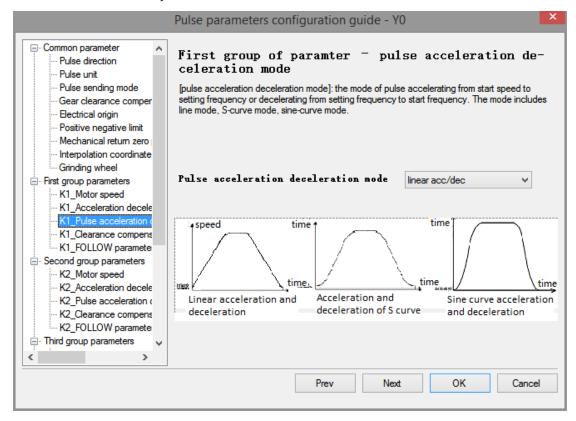
★ First group parameters —Acceleration and deceleration slope

Used to set default speed, default speed acceleration time, default speed deceleration time.

	Pulse parameters configuration guide - Y0		×
Common parameter Pulse direction Pulse unit Gear clearance comper Electrical origin Positive negative limit Mechanical return zero Interpolation coordinate Grinding wheel	First group of parameter- acce tion slope tart speed and end speed define the acceleration decele (pulse default speed - start speed)/pulse default deceleration slope-(pulse default speed - st speed deceleration time; the unit of pulse d pulse unit (when the pulse unit is pulse num Hz. When the pulse unit is equivalent, this p	ration slope. Accelerat t speed accelerat tart speed)/pulse efault speed is do ber, this parameter	tion slope= ion time; default epended on er unit is
First group parameters Window Speed Window S	Pulse default speed Pulse default speed acceleration time	1000	ms
Second group parameters K2_Motor speed K2_Acceleration decele K2_Pulse acceleration (K2_Clearance compens K2_FOLLOW paramete Third group parameters V	<pre>pulse default speed deceleration time Note: pulse default speed will change as pulse unit; if pul acceleration deceleration time.</pre>	10 Ise default speed is 0,	ms it means no
< >	Prev Next	ОК	Cancel

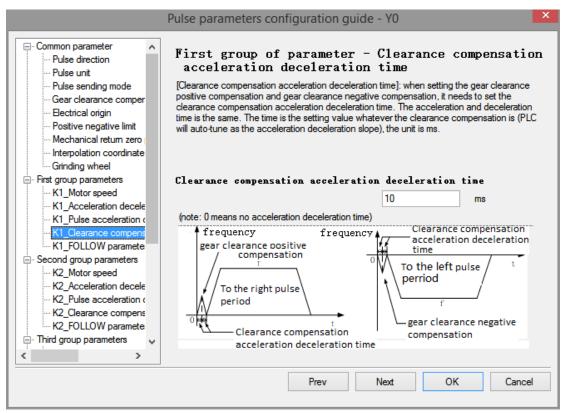
★ First group parameters —Pulse acceleration and deceleration mode

It is used to set three pulse acceleration and deceleration modes.



★ First group parameters —Clearance compensation acceleration and deceleration time

It is used to set the clearance compensation acceleration and deceleration time.



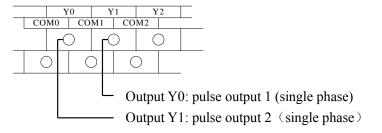
★ First group parameters —FOLLOW parameter

It is used to set the FOLLOW parameter and feedforward parameter.

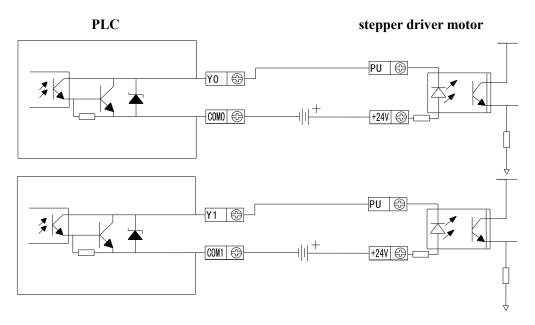
	Pulse parameters configuration guide - Y0	×
Common parameter Cube direction Pulse unit Pulse sending mode	First group of parameter - FOLLOW	
Gear clearance comper Gear clearance comper Electrical origin Positive negative limit Mechanical return zero	generator, and outputs corresponding pulse to control the stepper or servo motor. FOLLOW function is similar to servo rigidity. When this parameter is small, the follow rigidity is small (much delay time); when this parameter is large, the follow rigidity is large (ittle delay time). FOLLOW feedforward compensation: there is delay from receiving pulse to outputting pulse.	
 Interpolation coordinate Grinding wheel First group parameters 	this parameter can solve this problem. If setting too large, it will enter endless loop, the motor will vibrate after FOLLOW.	
K1_Motor speed K1_Acceleration decele K1_Pulse acceleration (
	FOLLOW parameter 10	
Second group parameters K2_Motor speed	(range 1~100, default value is 50)	
···· K2_Acceleration decele ···· K2_Pulse acceleration (FOLLOW feedforward parameter 0	
K2_Clearance compens K2_FOLLOW paramete	(range 0~100, default value is 0, it no need to set for general condition)	
Third group parameters	Note: when FOLLOW parameter is large, please do not set the feedforward parameter too large.	
	Prev Next OK Cancel	

The second to fourth group of parameters are the same as the first group of parameters, please refer to the first group of parameters! After configuring the parameters, the program is downloaded to the PLC again, and then the power is cut off and restarted to take effect.

1-4. Output wiring and notes

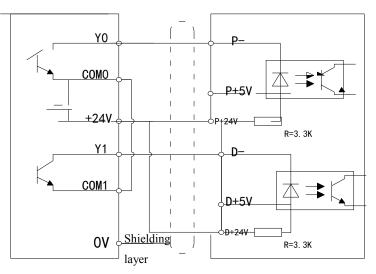


Below is a wiring diagram of the connection between the T-type output terminal and the stepper motor driver.



Note: If the pulse and direction terminals of stepper motor are driven by DC5V, please connect 2.2K resistance behind the pulse output terminal and direction output terminal.

Below is a wiring diagram of the connection between the T-type output terminal and the XINJE servo motor driver.

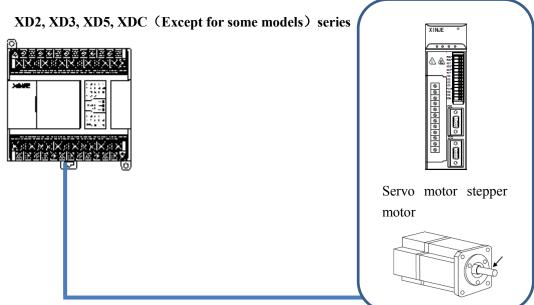


Note: Please suspend P+5V and D+5V.

Detailed hardware wiring diagram refers to XD/XL Series Programmable Controller hardware User Manual.



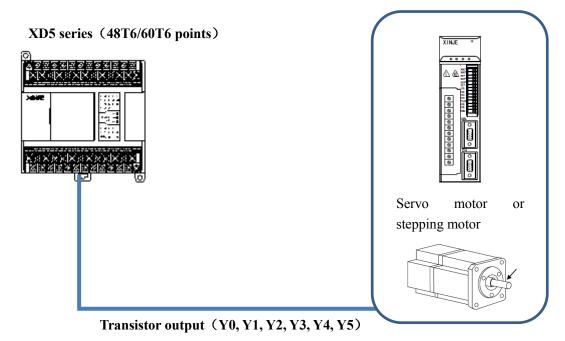
• XD2, XD3, XD5, XDC series PLC



Transistor output (Y0, Y1)

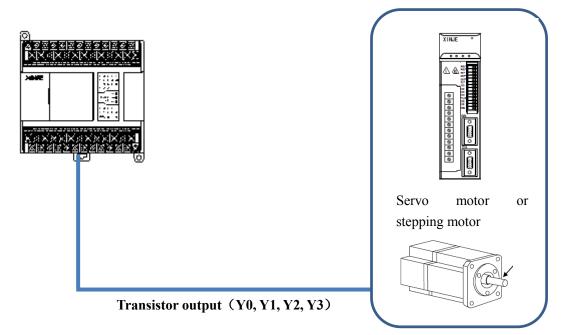
X:Two-axis servo motor or stepping motor can be controlled.

• XD5, XDM, XD5E, XDME series PLC

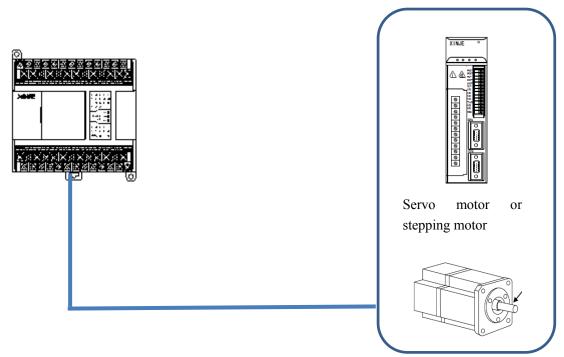


: Six-axis servo motor or stepping motor can be controlled.





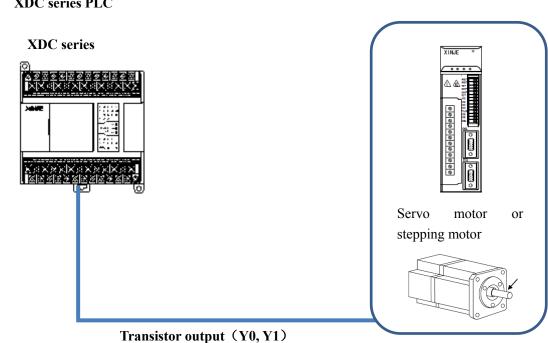
X: Four-axis servo motor or stepping motor can be controlled.



XDM series (60T10), XD5E series (60T10), XDME series (60T10)

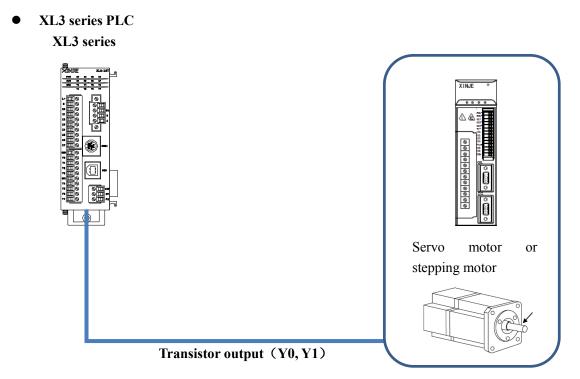
Transistor output (Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y10, Y11)

X: Ten-axis servo motor or stepping motor can be controlled.



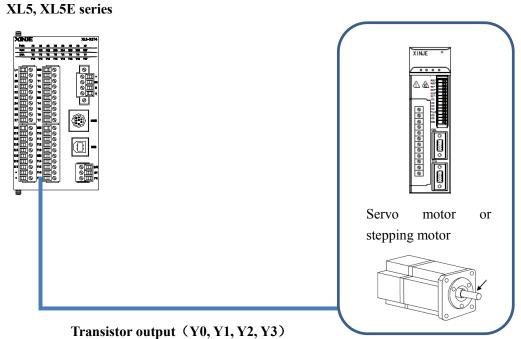
XDC series PLC

X: Two-axis servo motor or stepping motor can be controlled.



X: Two-axis servo motor or stepping motor can be controlled.

• XL5, XL5E series PLC



: 4-axis servo motor or stepping motor can be controlled.

1-4-2. Pulse output performance specification

Parameter	T/RT	T4	T6	T10	D4T4	
Axis number	2	4	6	10	8	
Interpolation function	/	XDM/XDME/ XDH/XLME support	/	XDM/XDME support	/	
Output mode		Open circuit mo	de of o	collector	Open collector, differential	
Output form		Pulse + di	irectio	n	pulse+direction, AB phase	
Max frequency	100KHz 100KHz		Differential:			
Acceleration and	Linear acceleration and deceleration + S curve acceleration and deceleration			ration and deceleration		
deceleration		+ sine curv	ve acc	celeration and deceleration		
treatment						
Control unit		Pulse,	lse, 1mm, 0.1mm, 0.01mm, 1um			
Positioning range		-21474	83648	3~2147483647 (puls	e)	
Programming	Ladder chart					
language						
Manual pulse connection	/	XDM/XDME/ XDH/XLME support	/	XDM/XDME support	/	

Pulse output performance specification:

Note:

(1) All XD/XL series PLC's pulse output must be transistor output type, otherwise it can't send pulse!

(2) PLC can output high-speed pulses ranging from 100KHz to 200KHz, but it can not guarantee the normal operation of all servos. Please connect 500 Ω resistance between the output and 24V power supply.

1-4-3. Positioning control layout and wiring notes

>>>>> Design notes<<<<<



Please set up a safety circuit outside the programmable controller, so that when there are abnormal external power supply and programmable controller failure, the whole system can also be ensured to operate in a safe state. Misoperation and misoutput may lead to accidents.

1. Make sure to set up emergency stop circuit, protection circuit, interlocking circuit to prevent reverse and positive actions simultaneously, positioning upper and lower limits and other interlocking circuits to prevent mechanical breakage outside the programmable controller.

2. When the programmable controller CPU detects abnormalities through self-diagnostic functions such as watchdog timer, all outputs become OFF. In addition, when abnormalities occur in the input and output control parts which cannot be detected by the programmable controller CPU, the output control sometimes fails.

At this point, please design the external circuit and structure to ensure that the machine is running in a safe state.

3. Because of the faults of relays, transistors, thyristors and so on in the output unit, sometimes the output is always ON or OFF.

In order to ensure the safe operation of machinery, please design the external circuit and structure for the output signal which may lead to major accidents.



1. The control line should not be tied up with the main circuit or power line, or close to the connection.

In principle, please leave more than 100 mm or away from the main circuit. Otherwise, the noise will cause misoperation.

2. When using, please ensure that the built-in programming interface, power connector, input and output connector are not subject to external forces.

Otherwise, it will lead to disconnection and malfunction.

>>>>> Wiring notes <<<<<



1. When installing, wiring and other operations, be sure to disconnect all external power supply before operation.

Otherwise, there is a risk of electric shock and product damage.

2. After installation, wiring and other operations, when running on power, be sure to install the attached wiring terminal cover on the product.

Otherwise, there is a risk of electric shock.

Attention!
1. AC power supply wiring should be connected to the special terminals recorded in the basic unit
manual.
If AC power supply is connected to DC output input terminal and DC power supply terminal, the
programmable controller will be burned down.
2. DC power supply wiring should be connected to the special terminals recorded in the basic unit
manual.
If AC power supply is connected to DC output input terminal and DC power supply terminal, the
programmable controller will be burned down.
3. Please do not wiring the empty terminals outside.
It may damage the product.
4. Grounding terminals of basic units of XD/XL series should be D grounded with wires over 2
mm ² (grounding resistance below 100Ω).
However, do not grounding with strong current (refer to XD/XL Series Programmable Controller
hardware User Manual).
5. When processing bolt holes and wiring operations, do not drop chips and wire chips into the
ventilation holes of the programmable controller.
Otherwise, it may lead to fire, malfunction and misoperation.
6. When using, make sure that the input and output connectors are not subject to external forces.
Otherwise, it will lead to disconnection and malfunction.
7. The input and output cables should be firmly mounted on the specified connectors.
Poor contact can lead to erroneous movements.
8. When wiring the basic units of XD/XL series and terminal of XD/XL series extension
equipment, please follow the following precautions.
Otherwise, it may lead to electric shock, fault, short circuit, wire breakage, misoperation and
damage to the product.
- Please process the end of the wire according to the size recorded in the manual.
Tightening torque, please follow the torque recorded in the manual.
>>>>> Cautions in Starting and Maintenance <<<<<
Danger!

1. Do not touch the terminal when electrifying.

Otherwise, there is the danger of electric shock, and it may cause misoperation.

2. When cleaning and tightening terminals, be sure to operate after disconnecting all external power supply.

If operated in the state of electrification, there is a danger of electric shock.

3. In order to change procedures, perform mandatory output, RUN, STOP and other operations

during operation, you must read the manual well before you can operate it with full confirmation of safety.

Operational errors may lead to mechanical damage and accidents.



1. Do not disassemble or alter products without authorization.

Otherwise, it may cause malfunction, misoperation and fire.

2. When disassembling and assembling connecting cables such as extended cables, please operate after disconnecting the power supply.

Otherwise, it may cause malfunction and misoperation.

3. Be sure to cut off the power supply when disassembling and assembling the following equipment.

Otherwise, it may cause malfunction and misoperation.

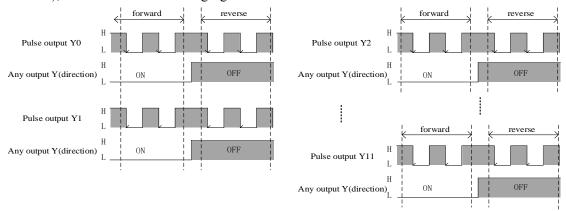
--Peripheral devices, extended function boards, special adapters,

--Input and Output Extension Module, Network Module, etc.

1-4-4. Setting of Servo Amplifier (Driving Unit) Side

Pulse Output Form of Programmable Controller Side

The pulse output types of XD/XL series PLC are all collector open circuit signals (pulse + direction), as shown in the following figure:



Note: ON and OFF represent the output state of the programmable controller; H and L represent the waveform of HIGH and LOW.

• Setting of Instruction Pulse Input Form for Servo Amplifier (Driving Unit)

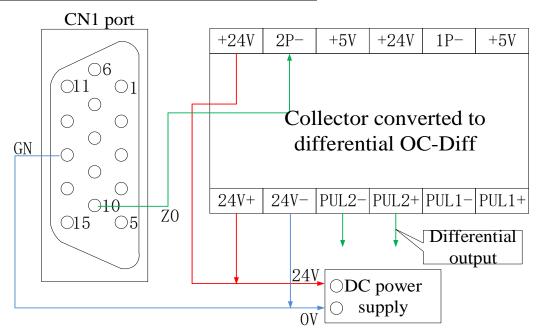
As shown in the table below, please make the input form of the pulse in the parameters of servo amplifier (driving unit) coincide with the output form of the programmable controller.

servo amplifier	Pulse output form of basic unit	Collector convert to
(driving unit)		differential DC-Diff

	Transistor output (Leakage output)	Differential drive
	Pulse + direction	Forward and reverse pulses
Instruction pulse input form	Pulse + sign	Forward and reverse pulses
Instruction pulse logic	Negative logic	Negative logic

Note: The main pulse output form of XD/XL series PLC is collector open-circuit signal output (pulse + direction). The collector open-circuit signal output (pulse + direction) can be converted into differential signal output through collector-to-differential expansion board DC-Diff.

<u>Wiring diagram of the open collector signal (pulse + direction) converted into differential</u> signal by DC-Diff (taking DS2-21P5-A as an example):



DS series servo driver parameter settings:

		Settings			
Series	Parameter	Pulse+direction	Differential signal		
		(negative logic)	(negative logic)		
DS2-AS	—		—		
DS2-AS2	—		—		
DS2-AS6	P2-00	2	1		
DS2-BS	—		—		
DS2-BS6	P2-00	2	1		
DS2-BSW	—		—		
DS2-BSW6	P2-00	2	1		
DS3-PQA	P2-00	2	1		
DS3E-PFA	P2-00	2	1		
DS3 series	P0-10	2	1		
DS3E series	P0-10	2	1		

• Electronic Gear Ratio of Servo Amplifier (Driving Unit) (Taking DS2 Series as an

Example)

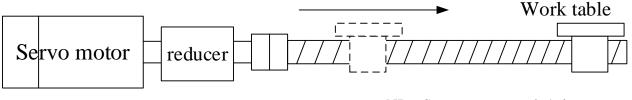
By using the electronic gear of the servo motor, the movement of each pulse can be set. For the setting of electronic gears, please refer to the manual of servo driver, set values that are consistent with the use.

Example 1

The movement of each pulse is set to $10 \ \mu$ m (when using mechanical screw).

Mechanical specifications

Servo driver	DS2 series
Rated Speed of Servo Motor	3000r/min
Ball screw lead pitch (Pb)	10mm
Reduction ratio of reducer (n)	1: 5
Resolution of servo motor (Pt)	10000PLS/REV



f0: Instruction pulse frequencyCMX: Electronic gear/numeratorCDV: Electronic gear/denominator

NR: Servo motor speed r/minX: Movement per pulse mm

The formula for calculating the ratio of electronic gears is as follows:

$$\frac{CMX}{CDV} = X \times \frac{Pt}{n \times Pb} = 10 \times 10^{-3} \times \frac{10000}{1/5 \times 10} = \frac{50}{1}$$

As can be seen from the figure above, the ratio of electronic gear of servo driver should be set to 50:1.

At this time, the rotation speed of the servo motor at the maximum output pulse frequency (200,000 Hz) of the basic unit is calculated as follows:

$$NR = \frac{CMX}{CDV} \times \frac{60}{Pt} \times f0$$

= $\frac{50}{1} \times \frac{60}{10000} \times 200000$
= $6000 r/min > 3000 r/min (Rated speed)$ 196

Note: Please set the maximum speed on the side of the programmable controller so that the rotation speed of the servo motor can be controlled below the rated speed.

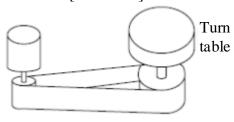
Example 2

The movement of each pulse is set to 0.01 degree (turntable).

Mechanical specifications

Servo driver	DS2 series
Servo motor rated speed	3000r/min
Turn table angle	360°/ REV
Reduction ratio (n)	1: 5
Servo motor resolution (Pt)	10000PLS/REV

Servo motor Pt=10000[PLS/REV]



Synchronous belt: 1:5

F0 : Instruction pulse frequency[Hz] (Collector open circuit)
CMX: Electronic gear (Instruction Pulse Multiplier numerator)
CDV: Electronic gear (Instruction Pulse Multiplier denominator)
NR : Servo motor speed [r/min]
X : Movement per pulse[^o]

The formula for calculating the ratio of electronic gears is as follows:

$$\frac{CMX}{CDV} = X \times \frac{Pt}{n \times 360} = 1 \times 10^{-2} \times \frac{10000}{1/5 \times 360} = \frac{25}{18}$$

As can be seen from the figure above, the ratio of electronic gear of servo driver should be set to 25:1.

At this time, the rotation speed of the servo motor at the maximum output pulse frequency (200,000 Hz) of the basic unit is calculated as follows:

$$NR = \frac{CMX}{CDV} \times \frac{60}{Pt} \times f0$$
$$= \frac{25}{18} \times \frac{60}{10000} \times 100000$$
$$= 833.33r/min < 3000r/min (Rated speed)$$

Because the rotating speed of the servo motor is below the rated speed, the maximum speed of the programmable controller side does not need to be limited.

• Ready signal of servo driver (take DS2 as an example)

DS2 series servo enabling signal effectively represents the electrification of the servo motor. When the servo enabling signal is invalid, the motor does not operate.

Series name	Parameter	Setting value
DS2 series	P5-10	0010

1-4-5. Pulse sending complete flag notes

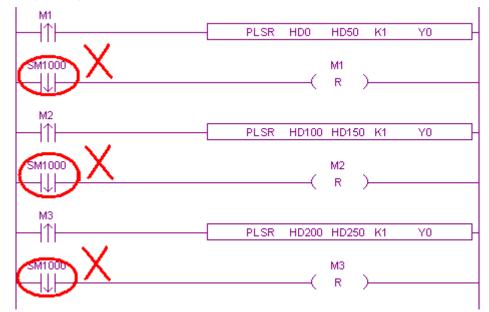
When the pulse sending flag SM1000, SM1020, SM1040 are changed from ON to OFF, it means that the action of instruction (pulse output action, etc.) is over. However, it does not mean that the action of the servo motor is over. In order to accurately grasp the end of the servo motor's operation, please correctly use the pulse sending flag.

Pulse sending flag:

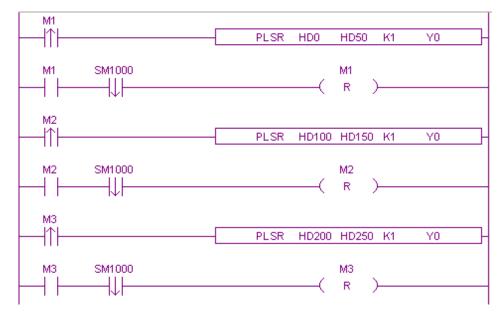
Flag	Axis	Explanation
SM1000	PULSE_1	When the pulse is sending, the coil is ON, and
SM1020	PULSE_2	the OFF is set immediately after the pulse is
SM1040	PULSE_3	sent. The falling edge of the coil is used to
SM1060	PULSE_4	judge whether the pulse is sent or not.
SM1080	PULSE_5	
SM1100	PULSE_6	frequency
SM1120	PULSE_7	
SM1140	PULSE_8	
SM1160	PULSE_9	Pulse
SM1180	PULSE_10	0 t SM1000

If multiple positioning instructions for the same pulse output port are written, then when the instructions are executed, the pulse flag SM1000, SM1020, SM1040 will change beween ON and OFF as each instructions. Therefore, if multiple instructions are executed, the sending pulse flag SM1000, SM1020, SM1020, SM1040... are used in the same program at the same time, it is impossible to judge which instruction is executed, and at the same time, it is impossible to obtain the flag supported by each instruction.

Wrong writing is as below:



Correct writing is as below:



1-4-6. Cautions for triggering conditions of positioning instructions

XD/XL series of PLC positioning instructions are mainly PLSR (edge trigger), PLSF (normal open/close trigger), DRVI (edge trigger), DRVA (edge trigger), ZRN (edge trigger). Except PLSF instruction, all the other pulse instructions are edge trigger. In the process of executing a positioning instruction, the same pulse output port (such as Y0) is sending pulse, flag bit (SM1000) is always ON. The PLC will not respond to the pulse instruction triggered at the same pulse output port until the pulse output instructions being executed are sent out and the signal bit being sent is reset.

Since the conduction condition of PLSF pulse instruction is normally open/closed, when PLSF instruction is used, the conduction condition of PLSF instruction should be reset immediately when the pulse does not need to be executed (do not only set the pulse output frequency to 0 Hz, but not reset the pulse conduction condition).

1-4-7. Positioning Instruction and System Parameter Block Related Parameters

System parameter	PLSR	PLSF	DRVI	DRVA	ZRN
Common parameter—pulse direction logic	Must set	Must set	×	×	Must set
Common parameter—enable soft limit	May not set	May not set	×	×	May not set
Common parameter — Default direction of mechanical return to origin	×	×	×	×	Must set
Common parameter —pulse unit	Must set	Must set	×	×	Must set
Common parameter — Interpolated coordinate mode	×	×	×	×	×
Common parameter — pulse send mode	Must set	Must set	×	×	Must set
Common parameter — pulse number(1 rotation)	May not set	May not set	×	×	May not set
Common parameter — offset(1 rotation)	May not set	May not set	×	×	May not set
Common parameter —pulse direction terminal	May not set	May not set	×	×	Must set
Common parameter —delay time of	May not	May not	~	\sim	May not
pulse direction	set	set	×	×	set
Common parameter —gear clearance	May not	May not	×	X	May not
positive compensation	set	set			set
Common parameter —gear clearance	May not	May not	\times	\times	May not

The following table sorts out the parameters setting of pulse output instruction and system parameter block:

negative compensation	set	set			set
Common parameter —electric origin	×	×	×	×	×
position		~	~	~	~
Common parameter — origin switch	×	×	×	×	Must set
state setting		~			
Common parameter — origin signal	×	×	×	×	Must set
terminal setting					
Common parameter —Z phase switch	×	×	×	×	May not
state setting					set
Common parameter — Z phase	×	×	×	×	May not
terminal setting					set
Common parameter —positive limit	May not	May not	×	×	Must set
switch status setting	set	set			
Common parameter —positive limit	May not	May not	×	×	Must set
terminal setting	set	set			
Common parameter —negative limit	May not	May not	×	×	Must set
switch status setting	set	set			
Common parameter —negative limit	May not	May not	×	×	Must set
terminal setting	set	set			
Common parameter —zero clear CLR	×	×	×	×	May not
signal output terminal setting					set
Common parameter — return speed	×	×	×	×	Must set
VL					
Common parameter —creeping speed	×	×	×	×	Must set
VC					
Common parameter — mechanical	×	×	×	\times	Must set
zero position					
Common parameter — Z phase	×	×	×	\times	May not
number					set
Common parameter — CLR signal	×	×	×	\times	May not
delay time					set
Common parameter —grinding wheel	×	×	×	×	×
radius(polar coordinate mode)					
Common parameter — soft limit					
positive limit value					
Common parameter — soft limit					
negative limit value					
Group 1 parameter — pulse default	Must set	Must set	\times	×	Must set
speed					
Group 1 parameter — acceleration	Must set	Must set	\times	×	Must set
time of pulse default speed					
Group 1 parameter — deceleration	Must set	Must set	\times	×	Must set
time of pulse default speed					

Group 1 parameter — Interval acceleration and deceleration time	May not set	May not set	×	×	May not set
Group 1 parameter — pulse acc/dec mode	Must set	Must set	×	×	Must set
Group 1 parameter —max speed	Must set	Must set	×	×	Must set
Group 1 parameter —start speed	Must set	Must set	×	×	Must set
Group 1 parameter —end speed	Must set	Must set	×	×	Must set

Note: group 2 to 4 parameters are same to group 1.

1-4-8. Troubleshooting of Servo Motor and Stepping Motor

When the servo motor and stepper motor do not work, please confirm the following items:

1) Please confirm the connection.

2) Please execute the positioning instructions to confirm the status of the following LED.

LED set as pulse output signal

LED set as pulse direction signal

3) Make sure that when the programmable controller executes the positioning instructions, the values of the accumulated pulse registers of each axis are changing.

The cumulative	registers for	or each r	oulse outr	out are shown	in the fo	llowing table:

No.	Function	Notes	Axis	
HSD0	Low 16-bit of cumulative pulse	Pulse number is the unit		
HSD1	High 16-bit of cumulative pulse	r uise number is the unit		
HSD2	Low 16-bit of cumulative pulse	Pulse equivalent is the	PULSE_1	
HSD3	High 16-bit of cumulative pulse	unit		
HSD4	Low 16-bit of cumulative pulse	Pulse number is the unit		
HSD5	High 16-bit of cumulative pulse	Puise number is the unit	PULSE 2	
HSD6	Low 16-bit of cumulative pulse	Pulse equivalent is the	FULSE_2	
HSD7	High 16-bit of cumulative pulse	unit		
HSD8	Low 16-bit of cumulative pulse	Pulse number is the unit		
HSD9	High 16-bit of cumulative pulse	Puise number is the unit		
HSD10	Low 16-bit of cumulative pulse	Pulse equivalent is the	PULSE_3	
HSD11	High 16-bit of cumulative pulse	unit		
HSD12	Low 16-bit of cumulative pulse	Pulse number is the unit		
HSD13	High 16-bit of cumulative pulse	Puise number is the unit	DILLSE 4	
HSD14	Low 16-bit of cumulative pulse	Pulse equivalent is the	PULSE_4	
HSD15	High 16-bit of cumulative pulse	unit		
HSD16	Low 16-bit of cumulative pulse	Dulas number is the writ		
HSD17	High 16-bit of cumulative pulse	ruise number is the unit	DIUSE 5	
HSD18	Low 16-bit of cumulative pulse	Pulse equivalent is the	PULSE_5	
HSD19	High 16-bit of cumulative pulse	unit		

HSD20	Low 16-bit of cumulative pulse	Dulse number is the unit	
HSD21	High 16-bit of cumulative pulse	i dise number is the unit	PULSE_6
HSD22	Low 16-bit of cumulative pulse	Pulse equivalent is the	
HSD23	High 16-bit of cumulative pulse	unit	
HSD24	Low 16-bit of cumulative pulse High 16-bit of cumulative pulse	D-1	
HSD25	High 16-bit of cumulative pulse	Pulse number is the unit	PULSE_7
HSD26	Low 16-bit of cumulative pulse	Pulse equivalent is the	
HSD27	High 16-bit of cumulative pulse	unit	
HSD28	Low 16-bit of cumulative pulse	Pulse number is the unit	
HSD29	High 16-bit of cumulative pulse	Puise number is the unit	PULSE_8
HSD30	Low 16-bit of cumulative pulse	Pulse equivalent is the	
HSD31	High 16-bit of cumulative pulse	unit	
HSD32	Low 16-bit of cumulative pulse	Dulas number is the unit	
HSD33	High 16-bit of cumulative pulse	Pulse number is the unit	PULSE_9
HSD34	Low 16-bit of cumulative pulse	Pulse equivalent is the	
HSD35	High 16-bit of cumulative pulse	unit	
HSD36	Low 16-bit of cumulative pulse	Dalaa markania (h	
HSD37	High 16-bit of cumulative pulse	Puise number is the unit	
HSD38	Low 16-bit of cumulative pulse	Pulse equivalent is the	PULSE_10
HSD39	High 16-bit of cumulative pulse	unit	

4) Make sure that the pulse output form of the programmable controller side and the servo amplifier (driving unit) is consistent.

5) Make sure that the stop bit of the pulse output is in action.

No.	Coil	Axis	Note		
1	SM1001	PULSE_1	When the pulse value is positive, the coil is		
2	SM1021	PULSE_2	ON; when the pulse value is negative, the coil		
3	SM1041	PULSE_3	is OFF.		
4	SM1061	PULSE_4			
5	SM1081	PULSE_5	frequency		
6	SM1101	PULSE_6			
7	SM1121	PULSE_7	Pulse / segment /		
8	SM1141	PULSE_8			
9	SM1161	PULSE_9			
10	SM1181	PULSE_10	SM1001		

The pulse output flags of each pulse are shown in the table below.

6) Please confirm whether the limit (positive limit and reverse limit) is in action.

7) Please confirm the action sequence of positioning instruction.

When the pulse flag bit is ON, the positioning instruction or the pulse output instruction using the

same output terminal can not be executed.

1-4-9. Troubleshooting of incorrect stop position of servo motor and stepper motor

When the stop position is incorrect, please confirm the following items:

- 1) Make sure that the setting of the electronic gear of the servo amplifier (driving unit) is correct.
- 2) Please confirm whether the origin position is offset.

A. When designing the origin signal, consider that there is enough time for ON to slow down

to crawling speed.

The ZRN instruction begins to decelerate to stop at the front end of the origin, delays and reverse accelerates to crawl speed, stops when it leaves the origin, and clears the current value register. Failure to slow down to crawl speed in front of the back end of the origin will cause stop position offset.

B. Please make the crawling speed slow enough.

The stop of the origin regression instruction is not decelerated, so if the crawling speed is too fast, the stop position will be offset due to inertia.

C. Soft components for origin signals.

The origin signal terminal can select all the input points on the PLC; but if the selected input point is the external interrupt terminal on the PLC main unit, the process of returning to the mechanical origin will be handled according to the interrupt, which can further improve the accuracy of returning to the mechanical origin (if Z phase is used to return to the origin, it will not affect); and the selected input point is the external interrupt terminal on PLC extention module, in the process of mechanical origin, it will be affected by the scanning cycle of PLC (if Z phase is used to return to the origin, it will not be affected).

3) After the forward and reverse rotation (round-trip action), the stop position deviates.

Because of the contact gap between the worktable and the ball screw, when the worktable switches from the forward movement to the reverse movement, the reverse actual movement distance is less than the set distance; when the worktable switches from the reverse movement to the forward movement, the forward actual movement distance is less than the set distance.

It can be corrected by forward gear clearance compensation and reverse gear clearance compensation.

1-5. Positioning instruction example programs

Action	Instruction	Program example	
Action	Instruction	Sequential ladder chart	
Multi section pulse	PLSR	1-5-4	1-5-5
positioning	FLSK	1-5-6	1-5-7
Variable frequency	PLSF	1-5-2	1-5-3
pulse output	PLSF	1-5-4	1-5-5
Relative single section	DRVI	1-5-2	1-5-3
positioning	DRVI	1-5-6	1-5-7
Absolute single	DRVA	1-5-2	1-5-3
section positioning	DKVA	1-5-6	1-5-7
Mechanical origin		1-5-2	1-5-3
	ZRN	1-5-4	1-5-5
regression		1-5-6	1-5-7

This section mainly introduces the use of PLSR, PLSF, DRVA, DRVI, ZRN instructions through several sample programs.

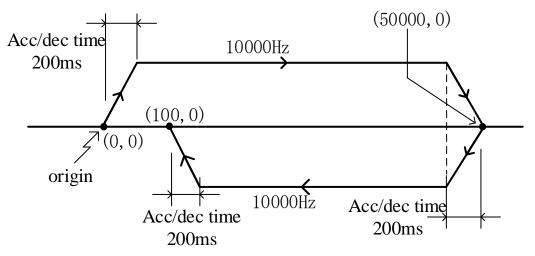
1-5-1. I/O point assignment

The pulse output Y0 (axis 1) is used in the program example. When using other pulse output terminals, please modify the corresponding soft components of the pulse axis.

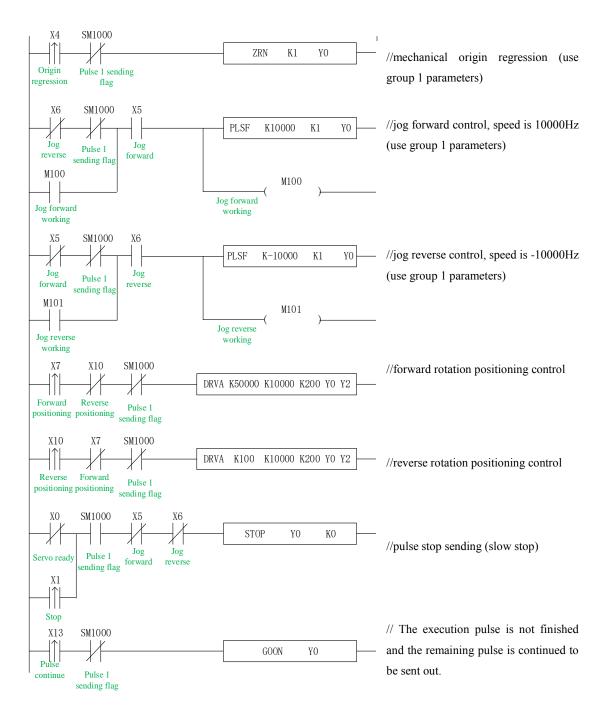
Signal name	I/O points	Notes
Pulse output port	Y0	
Pulse direction port	Y2	
CLR zero clear signal	Y3	
Servo ready	X0	
Stop	X1	
Pulse continue	X13	
Origin regression	X4	
Jog forward	X5	
Jog reverse	X6	
Forward rotation positioning	X7	
Reverse rotation positioning	X10	
Close origin input terminal	X2	
Origin input terminal	X3	External interruption terminal
Forward limit switch	X11	
Reverse limit switch	X12	

1-5-2. Forward and reverse rotation sequence control sample program **(PLSF, DRVI, DRVA, ZRN)**

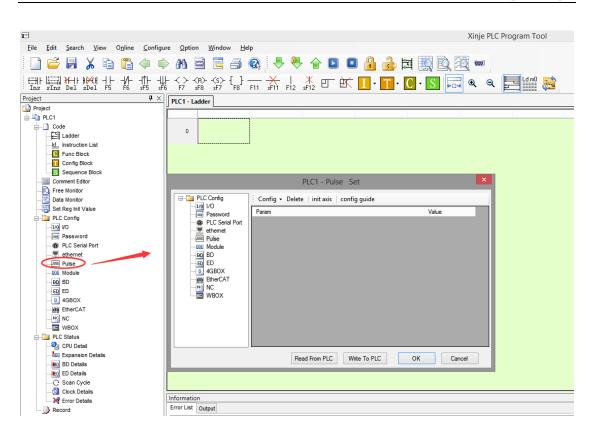
Example 1: According to the following figure, use the absolute single section positioning method.



Firstly, the ladder chart program is shown as follows:



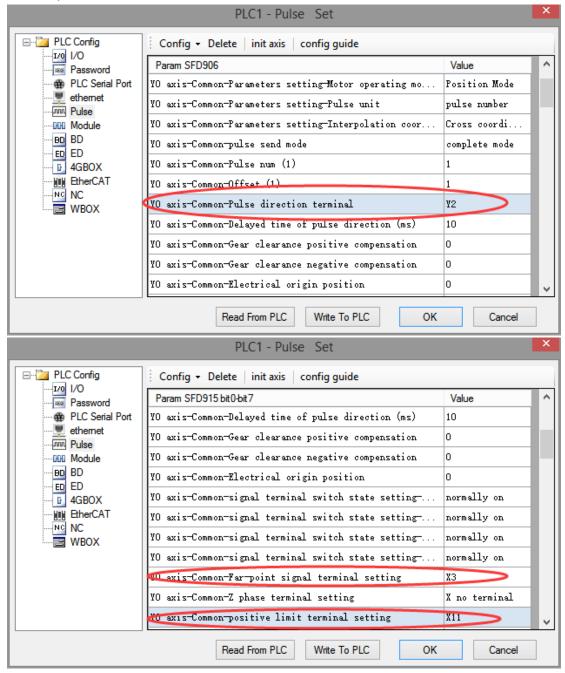
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So we click the "pulse configuration parameters" in the PLC programming software, as follows:

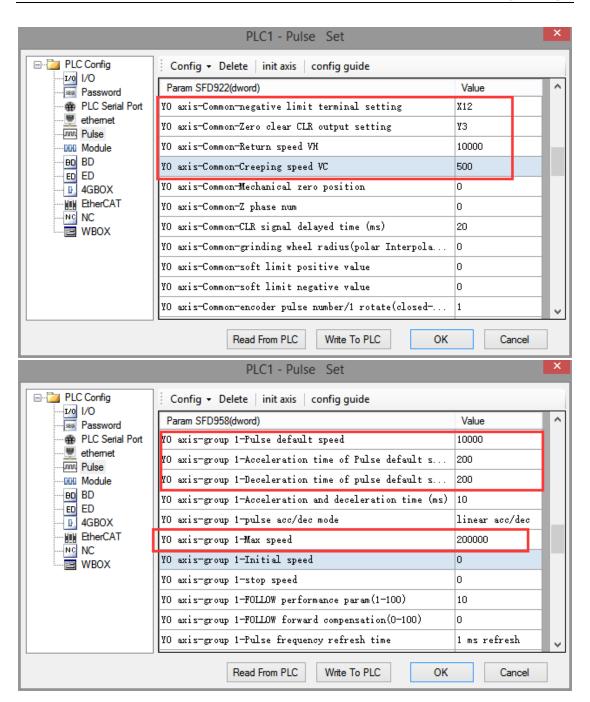


Click config, then select Y0 axis.

	PLC	C1 - Pulse Set		×
PLC Config	Config - Delete	init axis 🛛 config guide		
	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read F	rom PLC Write To PLC	OK Cancel	

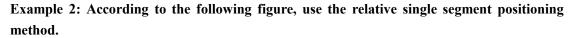
In the parameter configuration table, configure as follows (circled parameters need to be modified):

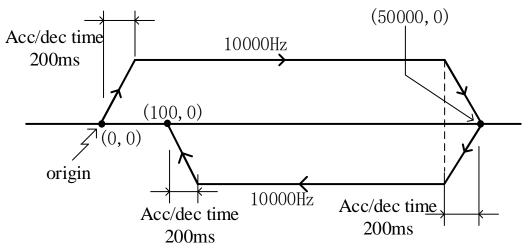




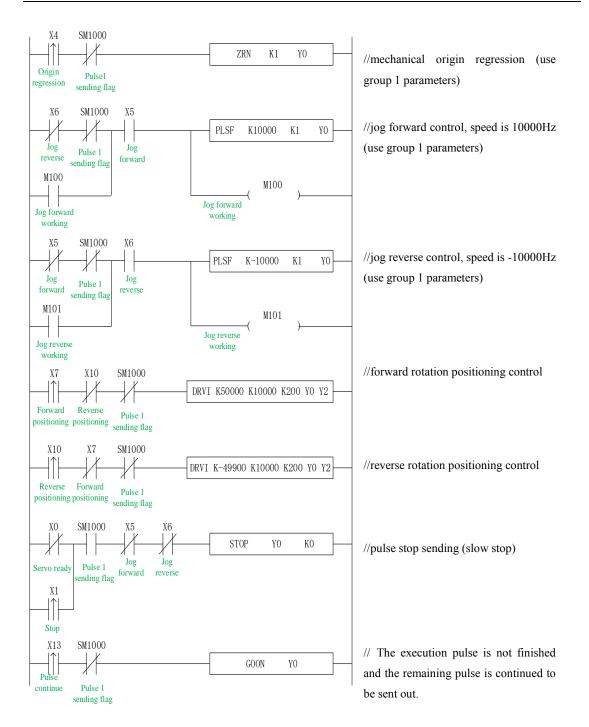
After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.





Firstly, make the ladder chart as follows:



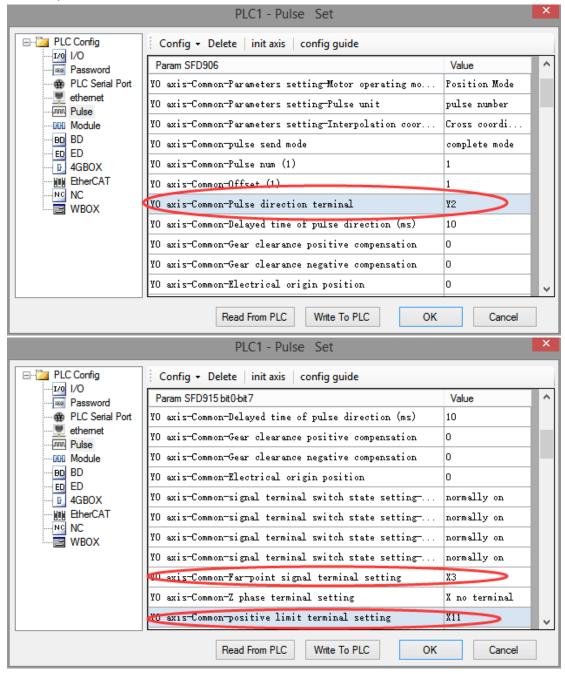
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

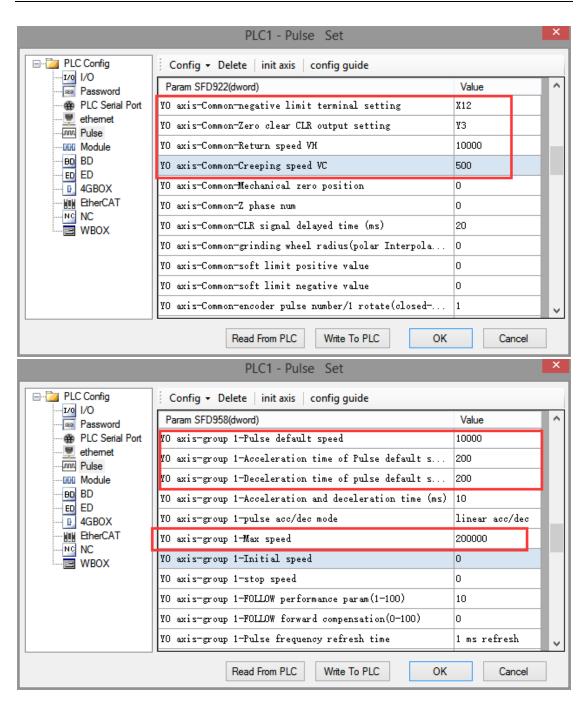
F	Xinje PLC Program Tool	
<u>File Edit Search View Online Configu</u>	ure Option Window Help	
🗋 🗳 📙 🔏 🛅 🗇 🛊	> AA 🖻 🖻 🥔 🐥 🌺 🔓 🗖 🗖 🚰 🍰 🛤	
	┟╴<>- ‹R>- ‹S> { } } — 🔆 │ # # U # U IX U IX [•] • [•] • [•] [•	
	6 F7 sF8 sF7 F8 F11 sF11 F12 sF12 🗆 🔼 💶 🔽 🔽 🔽 👘 🖓	
Project # X	PLC1 - Ladder	
Project		_
⊨-41 PLC1 ⊨-11 Code		
Ladder	0	
Config Block		
Sequence Block		
Comment Editor	PLC1 - Pulse Set	
Free Monitor		
Data Monitor	PLC Config Config - Delete init axis config guide	
Set Reg Init Value	Param Value	
- D PLC Config	Password Param Value	
	ethemet	
Password		
🌐 PLC Serial Port	- GGG Module	
Pulse		
	- B 4GBOX	
-BD BD	- With BherCAT NC NC	
<u>ED</u> ED		
B 4GBOX		
EtherCAT		
NC NC		
PLC Status		
CPU Detail		
200 Expansion Details		
BD Details	Read From PLC Write To PLC OK Cancel	
ED Details		
C Scan Cycle		
Clock Details		_
K Error Details	Information	
	Error List Output	

Click config, then select Y0 axis.

	PLC	21 - Pulse Set		×
PLC Config	Config - Delete i	nit axis 🛛 config guide		
I/O Password	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
······································	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
EtherCAT	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
		1		
	Read F	om PLC Write To PLC	OK Cancel	

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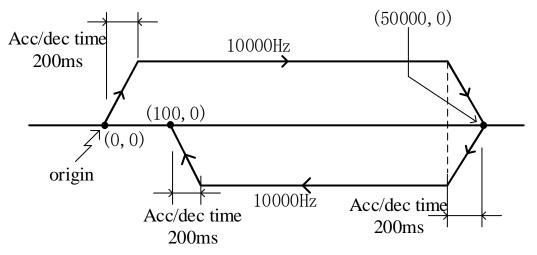


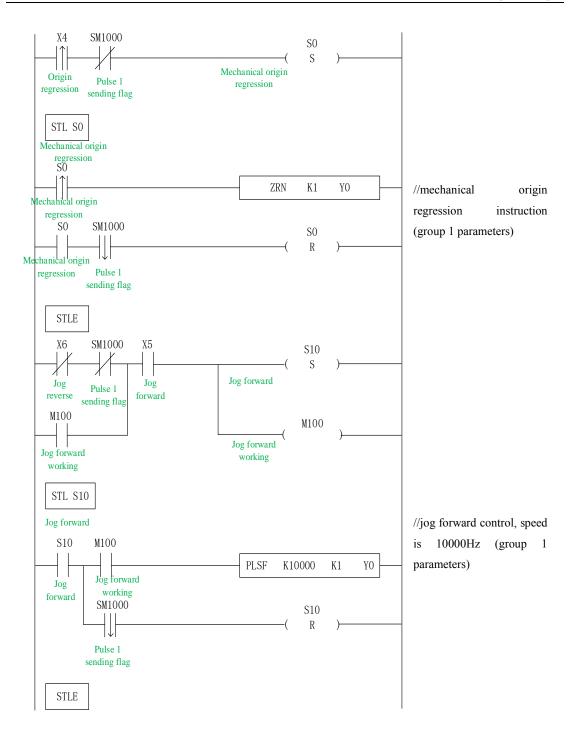
After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

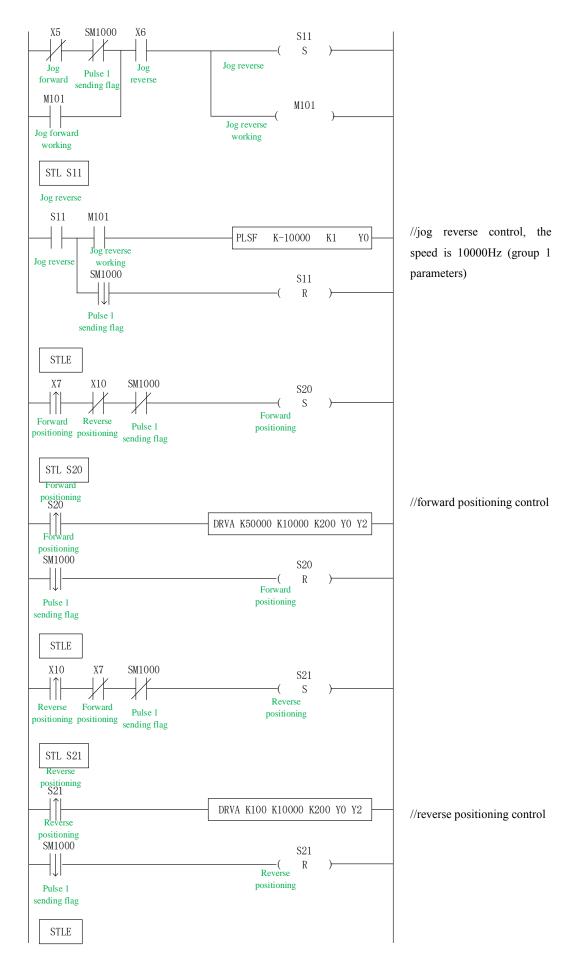
Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

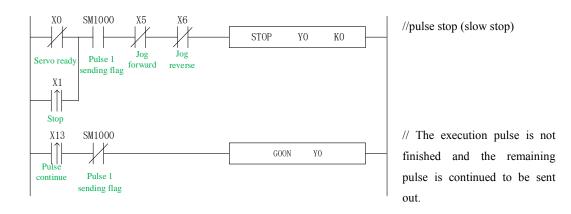
1-5-3. Forward and reverse rotation process program **(**PLSF, DRVI, DRVA, ZRN**)**

Example 1: According to the following figure, use the absolute single segment positioning method.

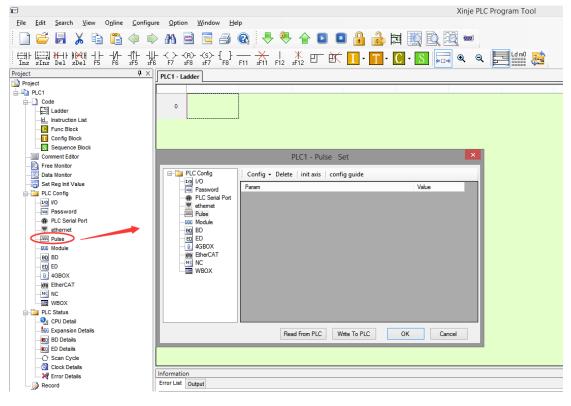








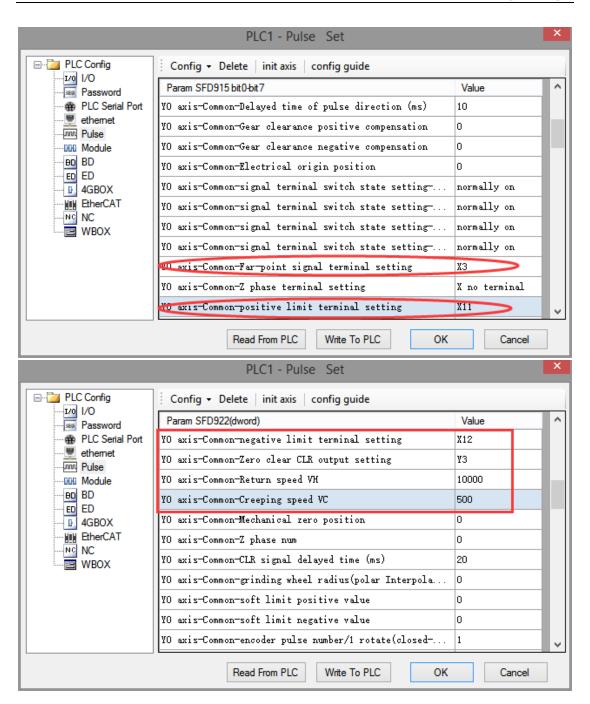
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:



Click config, then select Y0 axis.

_	PLC	1 - Pulse Set		×
PLC Corfig		it axis config guide	Value	
	Read Fro	om PLC Write To PLC	OK Cancel	

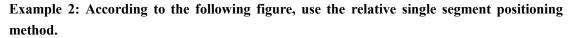
	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete init axis config guide		
Password	Param SFD906	Value	^
PLC Serial Port	YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
ethemet	YO axis-Common-Parameters setting-Pulse unit	pulse number	
	YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
ED ED	YO axis-Common-pulse send mode	complete mode	
B 4GBOX	YO axis-Common-Pulse num (1)	1	
EtherCAT	YO axis-Common-Offset (1)	1	
NC WBOX	10 axis-Common-Pulse direction terminal	¥2	
	YO axis-Common-Delayed time of pulse direction (ms)	10	
	YO axis-Common-Gear clearance positive compensation	0	
	YO axis-Common-Gear clearance negative compensation	0	
	YO axis-Common-Electrical origin position	0	_
	Read From PLC Write To PLC OK	Cancel	

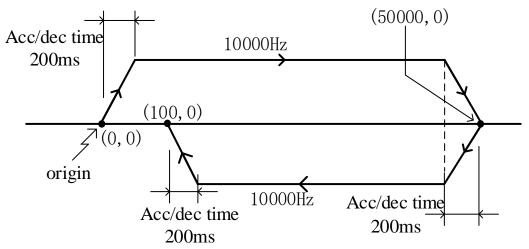


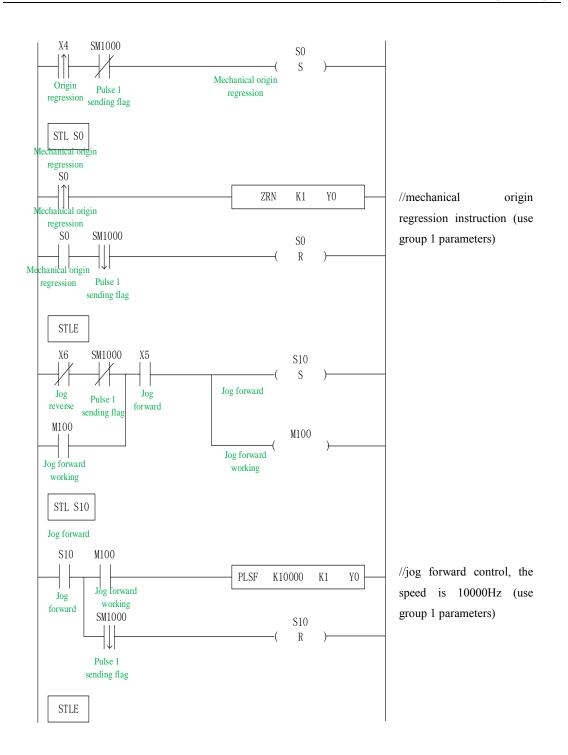
	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete init axis config guide		
Password	Param SFD958(dword)	Value	^
PLC Serial Port	10 axis-group 1-Pulse default speed	10000	
ethemet	YO axis-group 1-Acceleration time of Pulse default s	200	
	10 axis-group 1-Deceleration time of pulse default s	200	
ED ED	YO axis-group 1-Acceleration and deceleration time (ms)	10	
- D 4GBOX	YO axis-group 1-pulse acc/dec mode	linear acc/dec	
EtherCAT	YO axis-group 1-Max speed	200000	
	YO axis-group 1-Initial speed	0	
	YO axis-group 1-stop speed	0	
	YO axis-group 1-FOLLOW performance param(1-100)	10	
	YO axis-group 1-FOLLOW forward compensation(0-100)	0	
	YO axis-group 1-Pulse frequency refresh time	1 ms refresh	~
	Read From PLC Write To PLC OK	Cancel	

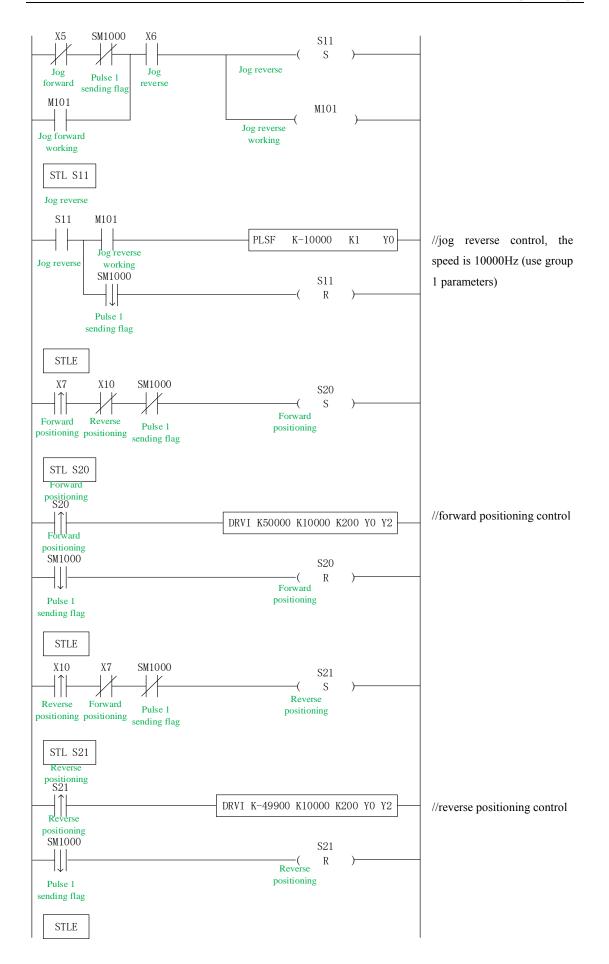
After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

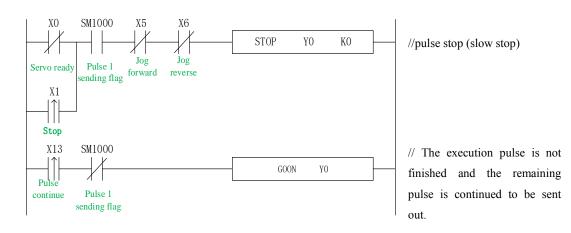
Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.











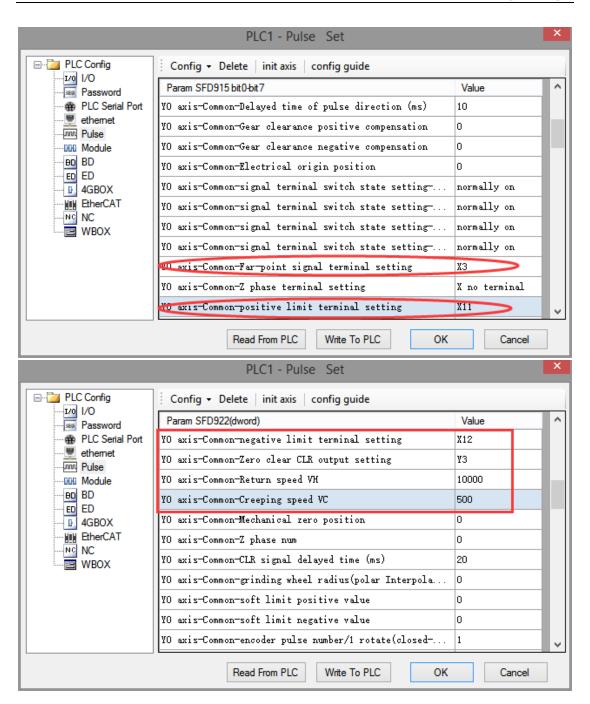
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

Ē	Xinje PLC Program Tool
<u>File Edit Search View Online Configu</u>	re <u>O</u> ption <u>W</u> indow <u>H</u> elp
📄 😅 📕 👗 🖻 🧯 🗘 🕻	> AA 🖻 📃 🚑 🚱 🐥 🤻 🏠 💵 🚨 🔒 🛱 🧱 🔯 🚥
	↓ < > {B}
Project 4 ×	PLC1 - Ladder
Project	
⊨⊡ PLC1 ⊨□ Code	
Ladder	0
Func Block	
Config Block	
Sequence Block	DIC1 - Duice Set
Comment Editor	PLC1 - Pulse Set
Data Monitor	🖃 🛅 PLC Config 🗧 Config - Delete init axis config quide
Set Reg Init Value	
PLC Config	Param Value Param
	- ethemet
Password	- Imp Pulse
PLC Serial Port ethernet	
Pulse	
	- D 4GBOX
BD BD	Hit EtherCAT
ED ED	
EtherCAT	
WBOX	
PLC Status	
Q CPU Detail	
200 Expansion Details	Read From PLC Write To PLC OK Cancel
BD Details	
ED Details	
Scan Cycle	
Clock Details	Information
B Record	Error List Output

Click config, then select Y0 axis.

_	PLC	1 - Pulse Set		×
PLC Corfig		it axis config guide	Value	
	Read Fro	om PLC Write To PLC	OK Cancel	

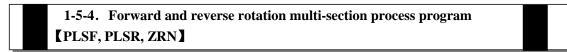
	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete init axis config guide		
Password	Param SFD906	Value	^
PLC Serial Port	YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
ethemet	YO axis-Common-Parameters setting-Pulse unit	pulse number	
	YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
ED ED	YO axis-Common-pulse send mode	complete mode	
B 4GBOX	YO axis-Common-Pulse num (1)	1	
EtherCAT	YO axis-Common-Offset (1)	1	
NC WBOX	10 axis-Common-Pulse direction terminal	¥2	
	YO axis-Common-Delayed time of pulse direction (ms)	10	
	YO axis-Common-Gear clearance positive compensation	0	
	YO axis-Common-Gear clearance negative compensation	0	
	YO axis-Common-Electrical origin position	0	_
	Read From PLC Write To PLC OK	Cancel	



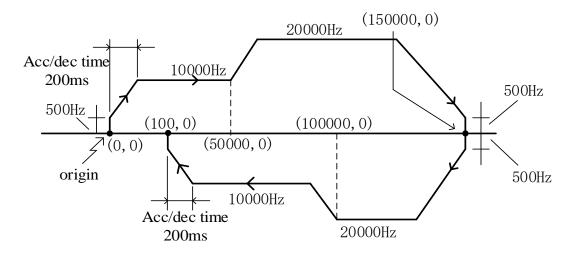
	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete init axis config guide		
Password	Param SFD958(dword)	Value	^
PLC Serial Port	10 axis-group 1-Pulse default speed	10000	
ethemet	YO axis-group 1-Acceleration time of Pulse default s	200	
	10 axis-group 1-Deceleration time of pulse default s	200	
ED ED	YO axis-group 1-Acceleration and deceleration time (ms)	10	
- D 4GBOX	YO axis-group 1-pulse acc/dec mode	linear acc/dec	
EtherCAT	YO axis-group 1-Max speed	200000	
	YO axis-group 1-Initial speed	0	
	YO axis-group 1-stop speed	0	
	YO axis-group 1-FOLLOW performance param(1-100)	10	
	YO axis-group 1-FOLLOW forward compensation(0-100)	0	
	YO axis-group 1-Pulse frequency refresh time	1 ms refresh	_
	Read From PLC Write To PLC OK	Cancel	

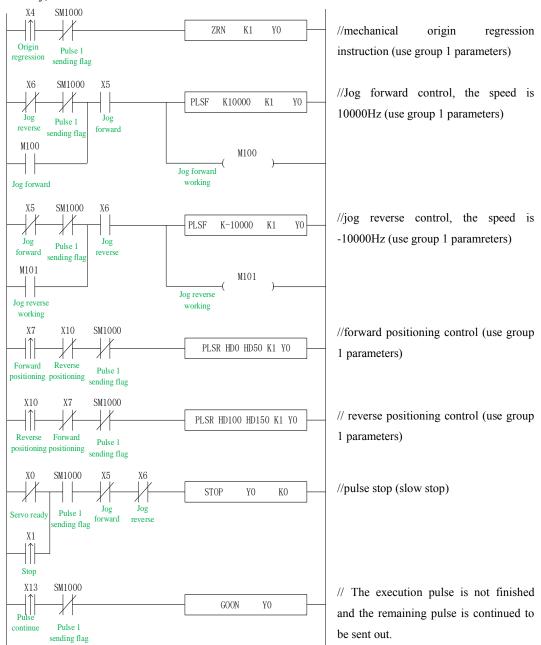
After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.



Example 1: According to the following figure, use multi-segment absolute positioning mode.



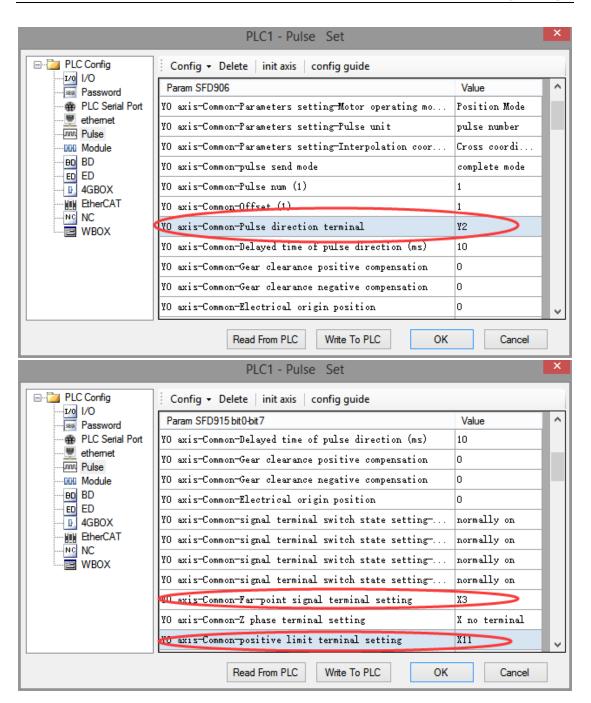


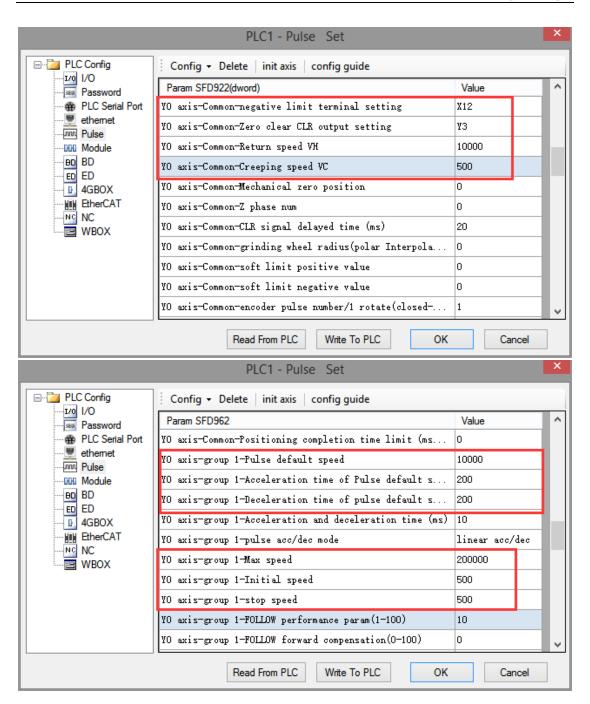
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

F			Xinje PLC	C Program Tool
<u>File Edit Search View Online Configu</u>	re Option Window Help			
-	A 🖻 🖬 🖉 🖉 🤻	🐣 🏠 🖸 🗖 🔒) III 🔣 🔯 📟	
TINS SINS Del SDel F5 F6 SF5 SF6	+ -< > - -<s> { } -</s> \$ F7 \$F8 \$F7 F8 F11 \$F11 \$F11 \$F11 \$F11 \$F11 \$F11 \$F		• C • S 🔜 @ 🧕	Ld m0
Project # X	PLC1 - Ladder			
Project				
- PLC1				
ECode I Ladder Instruction List C Func Block C Config Block	0			
Sequence Block				
Comment Editor		PLC1 - Pulse Set	×	
- 🛐 Free Monitor				
	PLC Config Config	Delete init axis config guide		
Set Reg Init Value	Param Password		Value	
PLC Config	PLC Serial Port			
Iro VO	ethemet			
Password				
ethernet	BD BD			
Pulse	ED ED			
	4GBOX			
BD BD	EtherCAT			
ED ED	NC NC			
L 4GBOX	WBOX			
WIN EtherCAT				
NC NC				
WBOX				
PLC Status				
CPU Detail				
200 Expansion Details		Read From PLC Write To PLC	OK Cancel	
BD Details		Nead From PLC VVite To PLC	UK Cancel	
ED Details				
Clock Details	L			
Error Details	Information			
- D Record	Error List Output			

Click config, then select Y0 axis.

	PLC	21 - Pulse Set		×
PLC Config	Config - Delete i	nit axis 🛛 config guide		
I/O Password	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
EtherCAT	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Cance	I





After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

	PLSR HD0 HD50 K1 Y0 PLSR Instruction Parameter Data Config	
·		
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
2	Cut	
	Сору	
1	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

		multi see	ction pu	ulse output					>
data start address:		er params address:	HD50	system params:	K1	output:	YO		
mode:	Upwards Down	art execute section count:	0	Config					
	frequence	pulse count		wait condition		wa regi		jump register	7

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

data start ado node:		execute section count:	HD50 system params: K1	output: Y0	
Add Dele	te Upwards Downwa	ırds			
	fr equence	puise count	wait condition	wait register	iumn register
1	10000	50000	pulse sending complete	КО	KO
▶ 2	20000	150000	pulse sending complete	KO	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

PLSR HD100 HD150 K1 Y0							
1	-	PLSR Instruction Parameter Data Config					
		PESK instruction Parameter Data Coning					
		Modify Reg Comment Ctrl+/					
		Add Row Comment					
		Show Node Comment					
	Ж	Cut					
	è	Сору					
	Ē.	Paste					

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

multi section pulse output							
data start address: HD100 user params address:	HD150	system params:	K1	output:	YO		
mode: absolut start execute section count:	0	Config					
Add Delete Upwards Downwards							

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

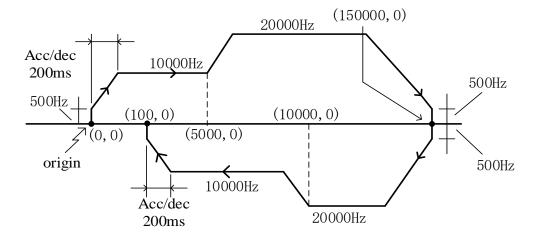
data start ad		arams address:	HD150 system params: K1	output: Y0	
node: Add Del	ete Upwards Downwa	xecute section count: rds	0 Config		
	frequence	pulse count	wait condition	wait register	jump register
1	20000	100000	pulse sending complete	KO	KO
▶ 2	10000	100	pulse sending complete	KO	KO

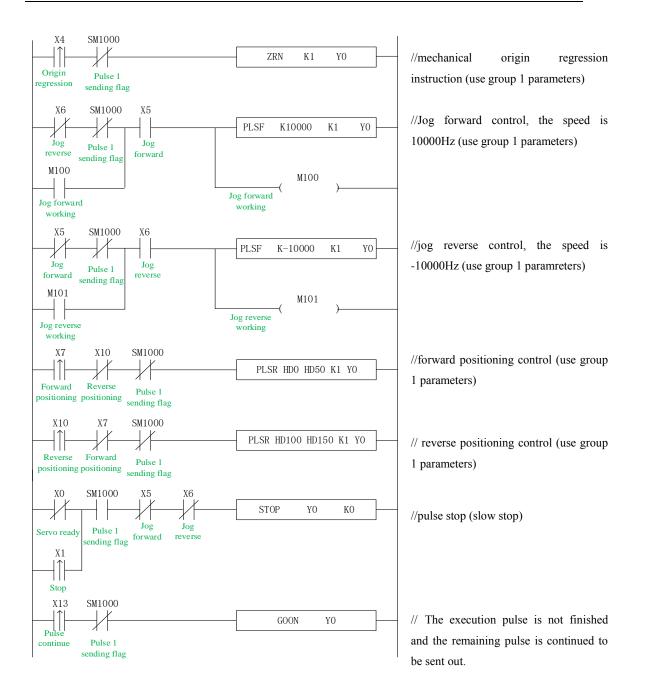
Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

After downloading the program, power off the PLC and then re-energize it.

Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

Example 2: According to the following figure, multi-segment relative positioning method is used.



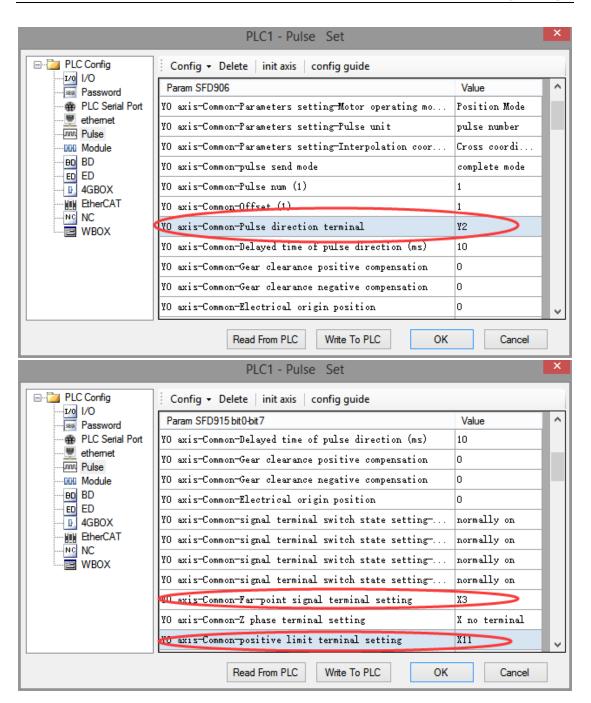


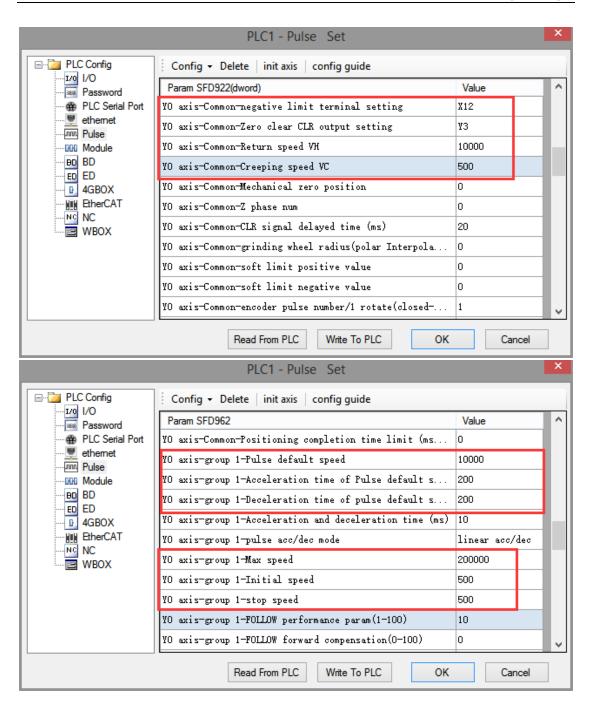
In the sample program, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

F	Xinje PLC Program Tool
<u>File Edit Search View Online Configu</u>	e Option Window Help
-	> A 🖻 🖻 📣 🔍 🧶 🐣 🍙 💵 💶 🔒 🍰 🛤 🧾 🔯 🚥
TINS SINS Del SDel F5 F6 SF5 SF6	- < 〉 < 祝〉 < { c} 〉 { c} \end{pmatrix}
Project # X	PLC1 - Ladder
Project	
-PLC1	
⊟– _ Code Ladder	0
d. Instruction List	
Config Block	
Sequence Block	
Comment Editor	PLC1 - Pulse Set X
Free Monitor	
Data Monitor	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
	Param Value
🖨 🫅 PLC Config	- Market Place Paral Port
I/0 VO	ethemet
Password	- Imp Pulse
PLC Serial Port	- 660 Module
ethernet	
Pulse Wodule	
	- Wy EtherCAT
- D 4GBOX	B BOX
WIN EtherCAT	
NC NC	
WBOX	
PLC Status	
😲 CPU Detail	
	Read From PLC Write To PLC OK Cancel
🔄 Clock Details	
	Information
Record	Error List Output

Click config, then select Y0 axis.

	PLC	1 - Pulse Set		×
PLC Config	Config - Delete i	nit axis 🛛 config guide		
Password	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
EtherCAT	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Can	cel





After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

[
<u>+</u> L	P	LSR HD0 HD50 K1 Y0	
		PLSR Instruction Parameter Data Config	
		Modify Reg Comment Ctrl+/	
		Add Row Comment	
		Show Node Comment	
	X	Cut	
	È	Сору	
	Ē.	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output							×	
Γ	data start address:	HD0	user params address:	HD50	system params:	K1	output:	YO	
	mode:	relative V	start execute section count:	0	Config				
	Add Delete Upwards Downwards								

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

noc	de:	relative ❤ start e	xecute section count:	0 Con	îg		
A	dd De	lete Upwards Downwa	rds				
r.		frequence	pulse count	wait cond	ition	wait	jump
t	1	10000	50000	pulse sendir	ng complete	KO	KO
Þ	2	20000	100000	pulse sendin	ng complete	KO	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

PLSR HD100 HD150 K1 Y0							
	<	PLSR Instruction Parameter Data Config					
		Modify Reg Comment Ctrl+/					
		Add Row Comment					
		Show Node Comment					
	Ж	Cut					
	è	Сору					
	Þ	Paste					

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output								×
Г									
L	data start address:	HD100	user params address:	HD150	system params:	K1	output:	Y0	
L	mode:	relative V	start execute section count:	0	Config				
L	Add Delete Upwards Downwards								

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of reverse rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

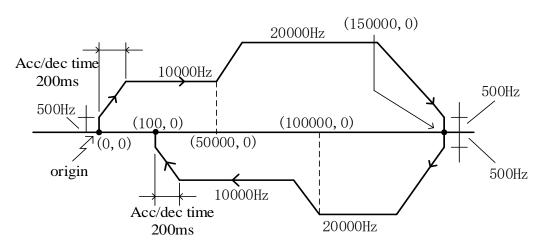
node:	relative 🗸	ecute section count:	0 Config				
Add De	lete Upwards Downward	ds					
	frequence	pulse count	moit condition		wa regi		jump register
1	20000	-50000	pulse sending comp	lete	KI)	KO
2	10000	-99900	pulse sending comp	lete	ĸ)	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

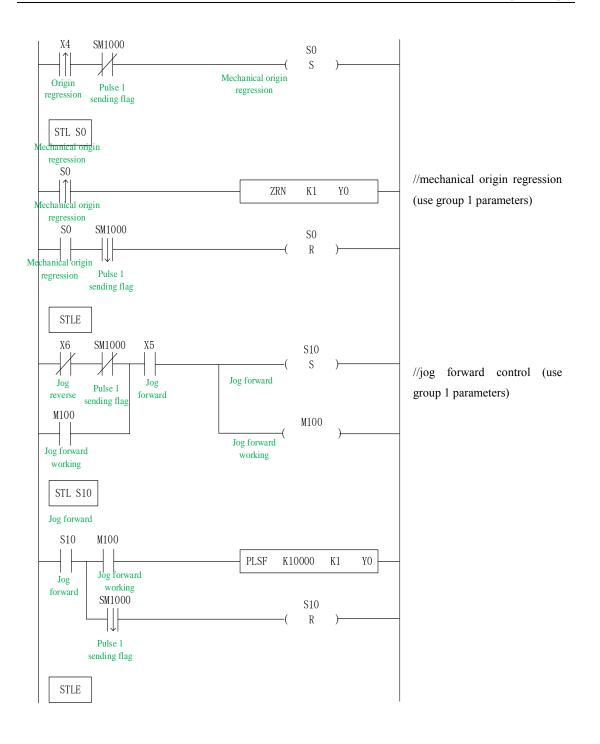
After downloading the program, power off the PLC and then re-energize it.

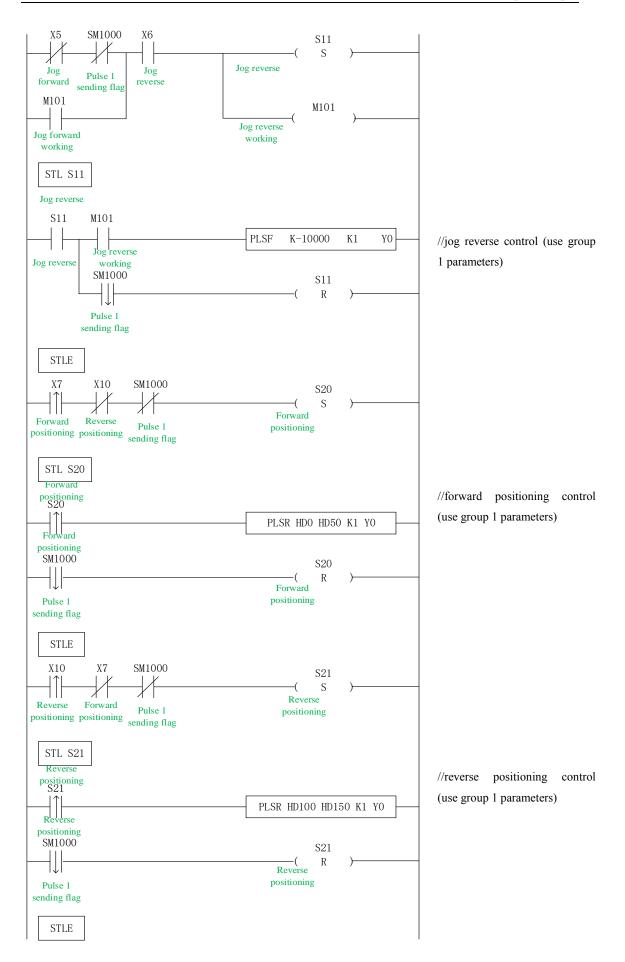
Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

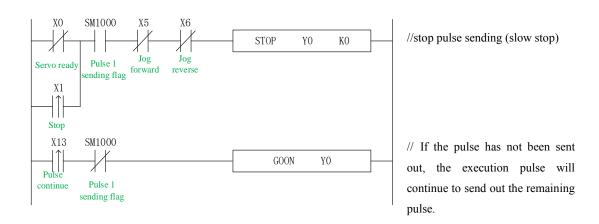




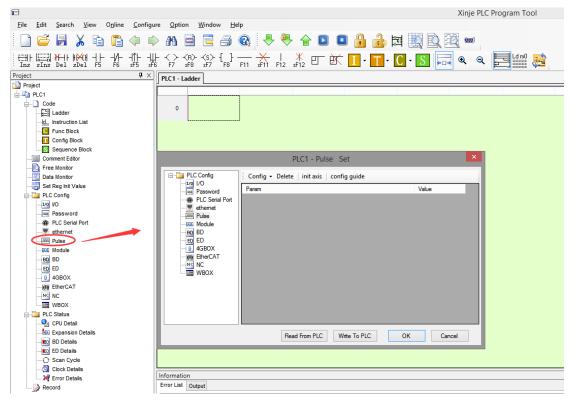
Example 1: According to the following figure, multi-segment absolute positioning is used.







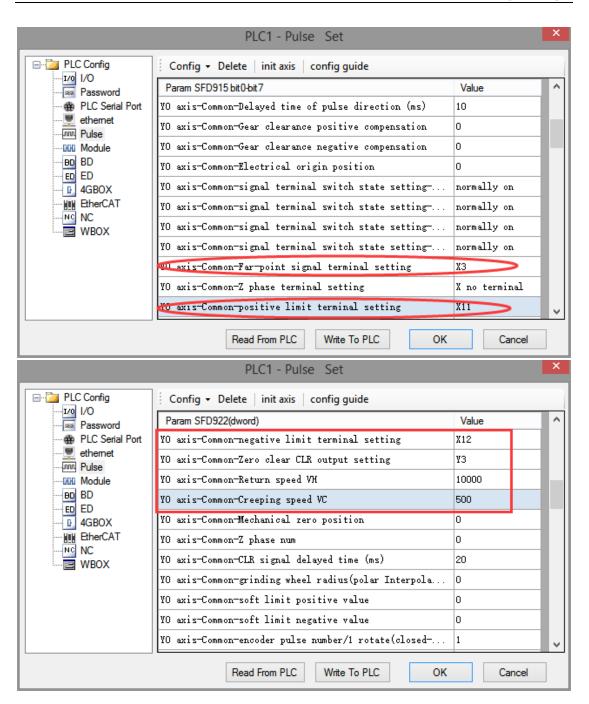
In the sample program, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:



Click config, then select Y0 axis.

_	PLC1 - Pulse Set	×
PLC Config Im I/O Im I/O Im Password Im PLC Serial Port Im PLS Im Nodule Im Module Im BD ID ED ID 4GBOX IM EtherCAT	Config • Delete init axis config guide Y0 axis Y1 axis Y2 axis Y3 axis Y4 axis Y5 axis Y6 axis	Value
WBOX	Y7 axis Y10 axis Y11 axis Read From PLC Write To PLC	OK Cancel

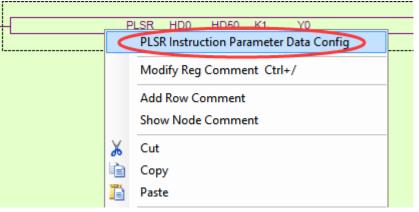
	PLC1 - Pulse Set		×	
PLC Config	Config 🗸 Delete init axis config guide			
	Param SFD906	Value	^	
PLC Serial Port	YO axis-Common-Parameters setting-Motor operating mo	Position Mode		
ethemet	YO axis-Common-Parameters setting-Pulse unit	pulse number		
	YO axis-Common-Parameters setting-Interpolation coor	Cross coordi		
ED ED	YO axis-Common-pulse send mode	complete mode		
B 4GBOX	YO axis-Common-Pulse num (1)	1		
EtherCAT	YO axis-Common-Offset (1)	1		
NC WBOX	10 axis-Common-Pulse direction terminal	¥2		
	YO axis-Common-Delayed time of pulse direction (ms)	10		
	YO axis-Common-Gear clearance positive compensation	0		
	YO axis-Common-Gear clearance negative compensation	0		
	YO axis-Common-Electrical origin position	0	_	
	Read From PLC Write To PLC OK	Cancel		



	PLC1 - Pulse Set		×
PLC Config PLC Config PlC Serial Port PLC Serial Port PLS Pluse Module BD ED D 4GBOX WBOX	Config 👻 Delete init axis config guide		
	Param SFD962	Value	^
	YO axis-Common-Positioning completion time limit (ms	0	
	YO axis-group 1-Pulse default speed	10000	
	YO axis-group 1-Acceleration time of Pulse default s	200	
	YO axis-group 1-Deceleration time of pulse default s	200	
	YO axis-group 1-Acceleration and deceleration time (ms)	10	1
	YO axis-group 1-pulse acc/dec mode	linear acc/dec	
	YO axis-group 1-Max speed	200000	
	YO axis-group 1-Initial speed	500	
	YO axis-group 1-stop speed	500	
	YO axis-group 1-FOLLOW performance param(1-100)	10	
	YO axis-group 1-FOLLOW forward compensation(0-100)		~
	Read From PLC Write To PLC OK	Cancel	

After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":



In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

multi section pulse output							×
	user params address: start execute section count:	HD50 system params:	K1	output:	YO		
Add Delete Upwards Downwards							1
frequence	pulse count	wait condition		wai regis		jump register	

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

data start mode:		execute section count:	HD50 system params: K1	output: Y0	
	Delete Upwards Downwa				
Г	fr equence	pulse count	wait condition	wait register	iumn register
-	10000	50000	pulse sending complete	KO	KO
▶ 2	20000	150000	pulse sending complete	KO	KO
L					

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

	PLSR HD100 HD150 K1 Y0	
 <	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
Х	Cut	
È	Сору	
B	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

	multi section pulse output											
data start address:	HD100	user params address:	HD150	system params:	K1	output:	YO					
mode:	absolut 🗸	start execute section count:	0	Config								
Add Delete U	Add Delete Upwards Downwards											

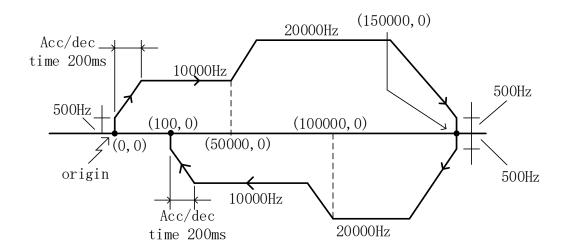
After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

		multi sec	ction pulse output							
data start address: HD100 user para		ess: HD100 user params address: HD150 system params: K								
mode: absolut V start exec		ecute section count:	0 Config							
Add Delete Upwards Downwards										
_	frequence	pulse count	wait condition	wait register	jump register					
1	20000	100000	pulse sending complete	KO	KO					
▶ 2	10000	100	pulse sending complete	KO	KO					
used space	e: HD100-HD129,HD150-HD	153	Read From PLC Write To PLC	ОК	Cancel					

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

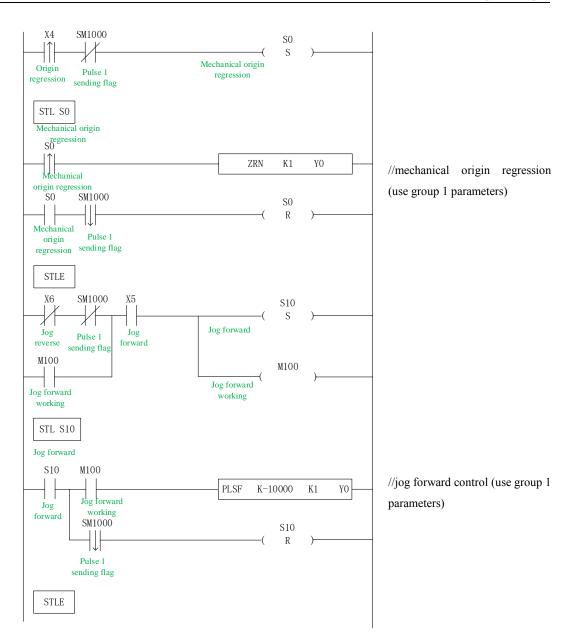
After downloading the program, power off the PLC and then re-energize it.

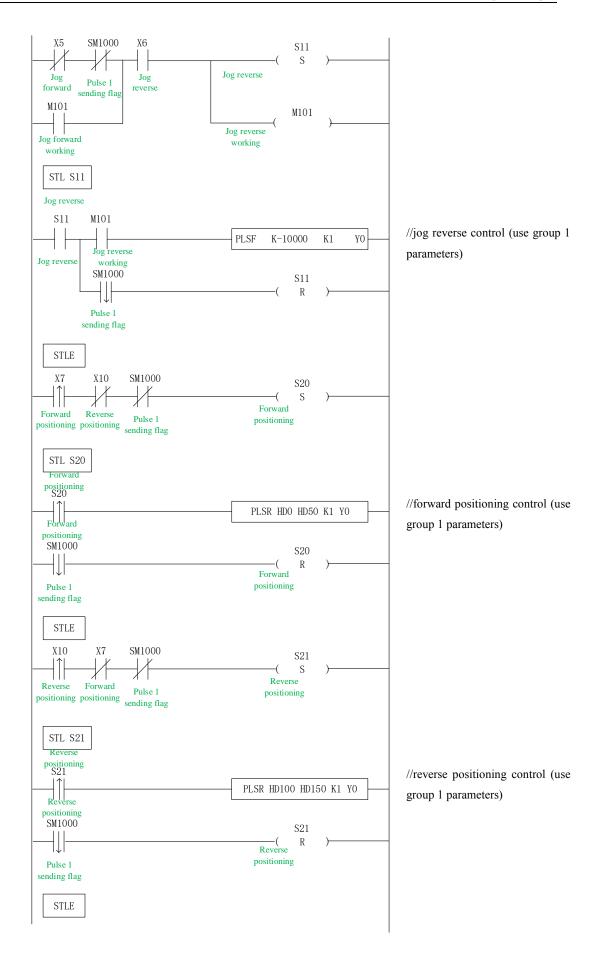
Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

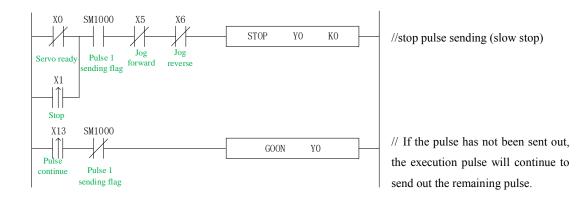


Example 2: According to the following figure, multi-segment absolute positioning mode is adopted.

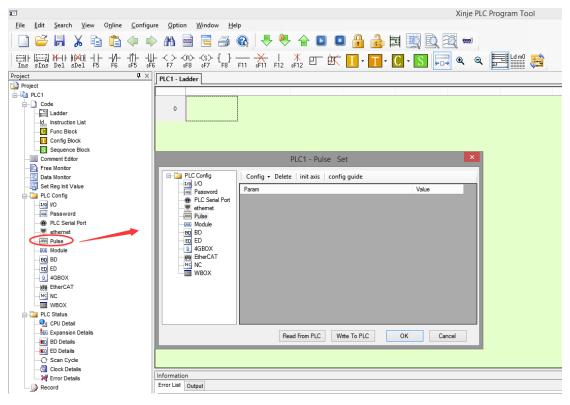
Firstly, make the ladder chart as follows:







In the sample program, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

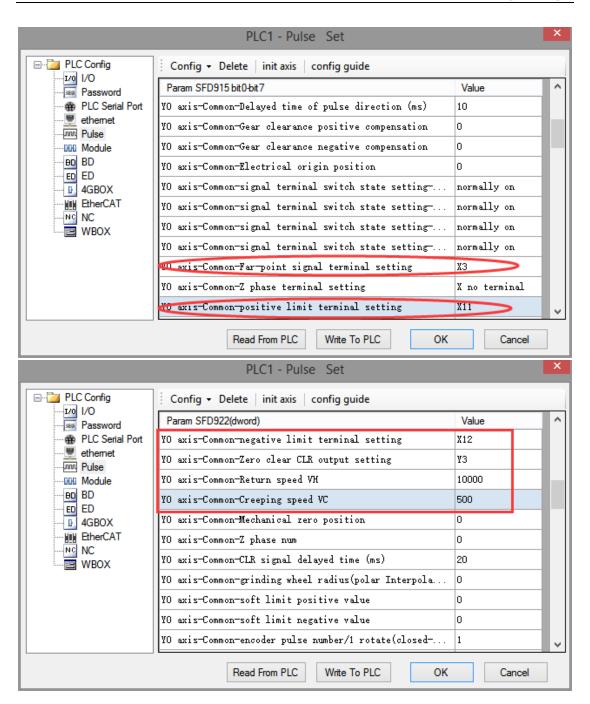


Click config, then select Y0 axis.

_	PLC1 - Pulse Set	×
PLC Corfig	Config Delete init axis config guide V0 axis V1 axis V2 axis V2 axis V3 axis V4 axis V5 axis V6 axis V7 axis V1 axis V1 axis V1 axis	Value
	Read From PLC Write To PLC	OK Cancel

In the parameter configuration table, configure as follows (circled parameters need to be modified):

	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete init axis config guide		
Password	Param SFD906	Value	^
PLC Serial Port	YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
ethemet	YO axis-Common-Parameters setting-Pulse unit	pulse number	
	YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
ED ED	YO axis-Common-pulse send mode	complete mode	
B 4GBOX	YO axis-Common-Pulse num (1)	1	
EtherCAT	YO axis-Common-Offset (1)	1	
NC WBOX	10 axis-Common-Pulse direction terminal	¥2	
	YO axis-Common-Delayed time of pulse direction (ms)	10	
	YO axis-Common-Gear clearance positive compensation	0	
	YO axis-Common-Gear clearance negative compensation	0	
	YO axis-Common-Electrical origin position	0	_
	Read From PLC Write To PLC OK	Cancel	



	PLC1 - Pulse Set		×				
PLC Config	Config 👻 Delete init axis config guide						
Password	Param SFD962	Value	^				
PLC Serial Port	YO axis-Common-Positioning completion time limit (ms	0					
ethemet	VO axis-group 1-Pulse default speed	10000					
	YO axis-group 1-Acceleration time of Pulse default s	200					
BD BD	YO axis-group 1-Deceleration time of pulse default s	200					
4GBOX	YO axis-group 1-Acceleration and deceleration time (ms)	10					
EtherCAT	YO axis-group 1-pulse acc/dec mode	linear acc/dec	,				
	YO axis-group 1-Max speed	200000					
	YO axis-group 1-Initial speed	500					
	YO axis-group 1-stop speed	500					
	YO axis-group 1-FOLLOW performance param(1-100)	10					
	YO axis-group 1-FOLLOW forward compensation(0-100)						
	Read From PLC Write To PLC OK	Cancel	I				

After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

	PLSR HD0 HD50 K1 Y0	
	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
2	🖌 Cut	
	🗎 Сору	
1	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output										
Г											
	data start address:	HD0	user params address:	HD50	system params:	К1	output:	YO			
	mode:	relative V	start execute section count:	0	Config						
	Add Delete	Upwards Do	ownwards								

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

ata sta	t address:	HD0 user	params address:	HD50	system params:	K1	output:	Y0	
ode:		relative 🗸 start	execute section count:	0	Config				
Add	Delete Up	owards Downw	vards						
_	£	requence	pulse count	wait condition			Wa	it	jump
1		10000	50000	pu	lse sending comp	plete	-	KO	
2		20000	100000	pu	lse sending comp	plete	K)	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

-		PLSR HD100 HD150 K1 Y0	
	<	PLSR Instruction Parameter Data Config	
		Modify Reg Comment Ctrl+/	
		Add Row Comment	
		Show Node Comment	
	Ж	Cut	
	È	Сору	
	B	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output										
Г											
L	data start address:	HD100	user params address:	HD150	system params:	K1	output:	YO			
L	mode:	relative 🗸	start execute section count:	0	Config						
L	Add Delete Upwards										

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of reverse rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

ata star	t address: HD100 u	ser params address:	HD150	system params:	K1	output:	Y0	
		tart execute section count:	te section count: 0 Config					
Add	Delete Upwards Dow	nwards						
	froquence	pulco coupt		moit condition		wa regi		jump register
1	20000	-50000	թվ	.se sending comp	lete	K)	KO
2	10000	-99900	թվ	se sending comp	lete	K	2	KO

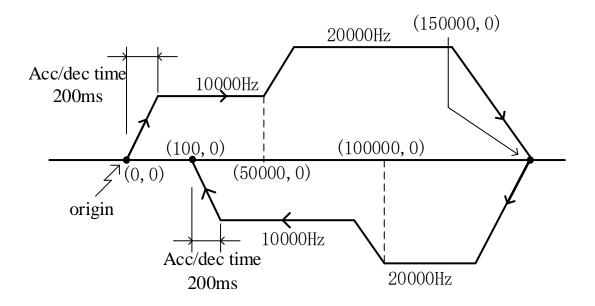
Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

After downloading the program, power off the PLC and then re-energize it.

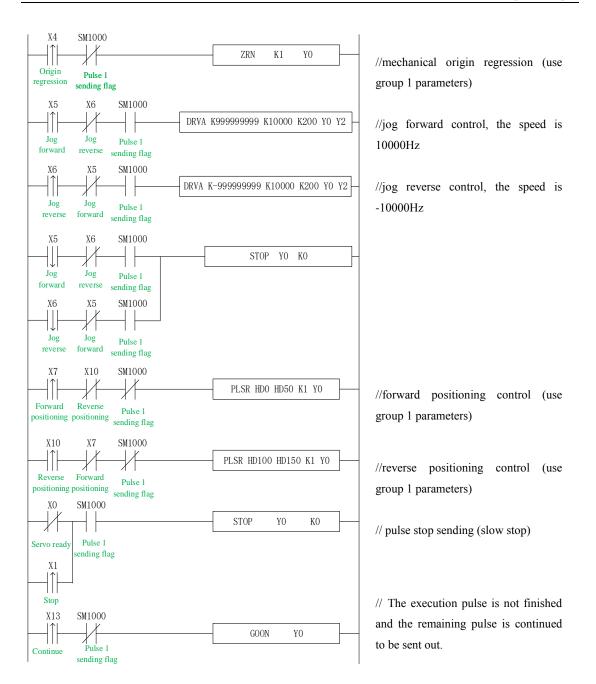
Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

1-5-6. Forward reverse rotation mulsti-segment sequential control program **(DRVI, DRVA, PLSR, ZRN)**

Example 1: According to the following figure, multi-segment absolute positioning mode is adopted.



Firstly, make the ladder chart as follows:



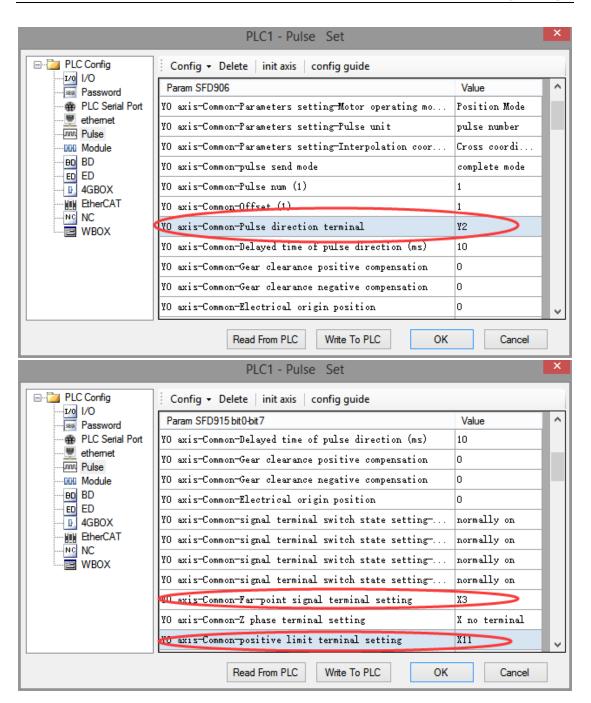
In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

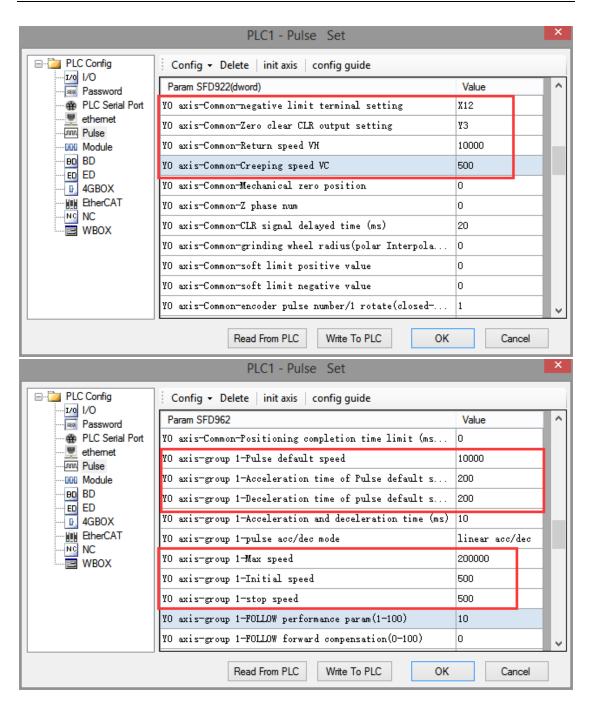
F	Xinje PLC Program Tool
<u>File Edit Search View Online Configu</u>	e Option Window Help
-	> A& 🖻 🖻 🚑 🚱 🐣 🐥 🏠 💵 💶 🔒 🍰 🛤 🧱 🔯 📟
TINS SINS Del SDel F5 F6 SF5 SF6	- < 〉 < 祝〉 < { } 、 - { ; } 、 - { ; } 、 - { ; }
Project # X	PLC1 - Ladder
Project	
-PLC1	
⊟– _ Code Ladder	0
d. Instruction List	
Config Block	
Sequence Block	
Comment Editor	PLC1 - Pulse Set X
Free Monitor	
Data Monitor	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
	Param Value
🖨 🫅 PLC Config	- Market PlcSerial Port
I/0 VO	ethemet
Password	- Imp Pulse
PLC Serial Port	- 660 Module
Pulse Wodule	
	- Wy EtherCAT
- D 4GBOX	B BOX
WIN EtherCAT	
NC NC	
WBOX	
PLC Status	
😲 CPU Detail	
	Read From PLC Write To PLC OK Cancel
🔄 Clock Details	
Kerror Details	Information
Record	Error List Output

Click config, then select Y0 axis.

	PLC	21 - Pulse Set		×
PLC Config	Config - Delete i	nit axis 🛛 config guide		
I/O	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
EtherCAT	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Canc	el

In the parameter configuration table, configure as follows (circled parameters need to be modified):





After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

	PLSR HD0 HD50 K1 Y0 PLSR Instruction Parameter Data Config	
·		
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
2	Cut	
	Сору	
1	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

multi section pulse output									>
data start address:		er params address:	HD50	system params:	K1	output:	YO		
mode:	Upwards Down	art execute section count:	0	Config					
	frequence	pulse count		wait condition		wa regi		jump register	7

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

data start ado node:		execute section count:	HD50 system params: K1	output: Y0	
Add Dele	te Upwards Downwa	ırds			
	fr equence	puise count	wait condition	wait register	iumn register
1	10000	50000	pulse sending complete	КО	KO
▶ 2	20000	150000	pulse sending complete	KO	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

		PLSR HD100 HD150_K1 Y0	
1	<	PLSR Instruction Parameter Data Config	
		Modify Reg Comment Ctrl+/	
		Add Row Comment	
		Show Node Comment	
	Ж	Cut	
	È	Сору	
	Ð	Paste	

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

multi section pulse output							
data start address: HD100 user params address:	HD150	system params:	K1	output:	YO		
mode: absolut start execute section count:	0	Config					
Add Delete Upwards Downwards							

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

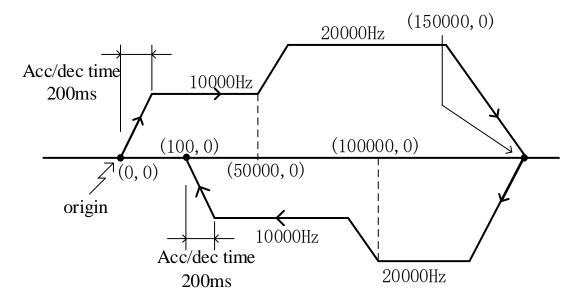
data start ad		arams address:	HD150 system params: K1	output: Y0	
node: Add Del	ete Upwards Downwa	xecute section count: rds	0 Config		
	frequence	pulse count	wait condition	wait register	jump register
1	20000	100000	pulse sending complete	KO	KO
▶ 2	10000	100	pulse sending complete	KO	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

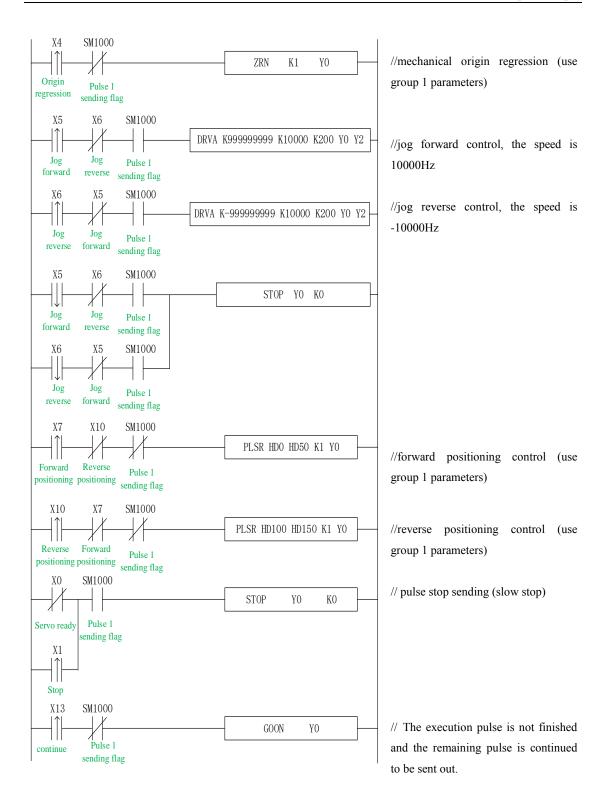
After downloading the program, power off the PLC and then re-energize it.

Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

Example 2: According to the following figure, the relative multi-segment pulse positioning method is used.



Firstly, make the ladder chart as the follows:



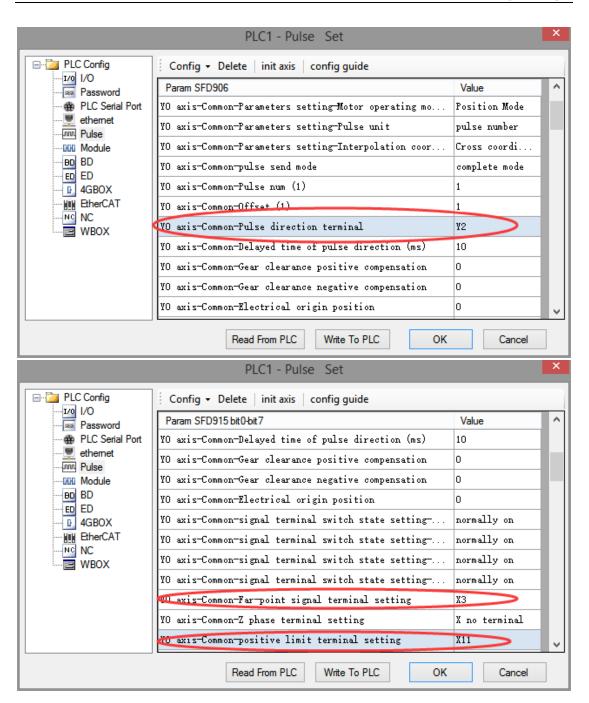
In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

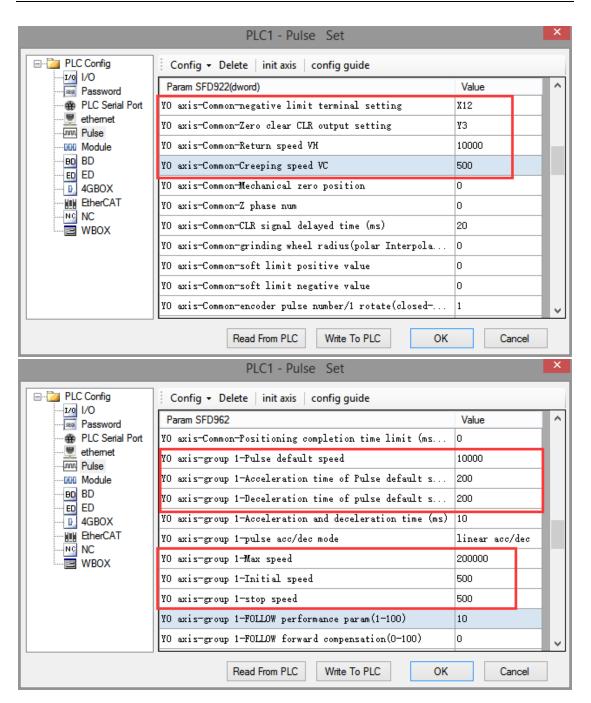
T	Xinje	PLC Program Tool
<u>File Edit Search View Online Configur</u>	re <u>O</u> ption <u>W</u> indow <u>H</u> elp	
📄 😅 📕 👗 🖻 🧯 🗘 🕸	> M 🖻 🖻 🦪 🔇 🐣 🌺 🍙 💶 🔒 🍰 🛤 🔯 🗟 🗮	
HH [112] # HH HHH HH - H - H - HH - HH Ins sIns Del sDel F5 F6 sF5 sF6	┼ < > <	Q 🚰 Ld m0 👼
Project 4 ×	PLC1 - Ladder	
Project		
E PLC1		
Code	0	
d Instruction List		
Func Block		
Config Block		
S Sequence Block		
Comment Editor	PLC1 - Pulse Set	
- 📴 Free Monitor		7
	□-□ PLC Config Config Confi	
Set Reg Init Value	Param Value	41
E-E Config	PLC Serial Port	41
Password	ethemet	41
PLC Serial Port		41
ethernet	-B0 BD	48
Pulse	ED ED	48
	4GBOX	48
BD BD	HIN EtherCAT	41
ED ED		41
B. 4GBOX		41
EtherCAT		41
NC		41
WBOX		41
E-I PLC Status		41
Expansion Details		-
BD Details	Read From PLC Write To PLC OK Cancel	
ED Details		
Scan Cycle		
Clock Details		
	Information	
- B Record	Error List Output	

Click config, then select Y0 axis.

	PLC	1 - Pulse Set		×
PLC Config	Config 🗕 Delete i	nit axis 🛛 config guide		
Password	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
EtherCAT	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Cancel	

In the parameter configuration table, configure as follows (circled parameters need to be modified):





After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

<u></u> ₽ <u></u>	P	LSR HD0 HD50 K1 Y0	1
		PLSR Instruction Parameter Data Config	
		Modify Reg Comment Ctrl+/	
		Add Row Comment	
		Show Node Comment	
	X	Cut	
	È	Сору	
	Ē.	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output									
Г										
L	data start address:	HD0	user params address:	HD50	system params:	K1	output:	YO		
	mode:	relative 🗸	start execute section count:	0	Config					
	Add Delete l	Jpwards Do	ownwards							

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

nod			ecute section count:	0 Config			
Ac	dd Del	ete Upwards Downwar frequence	ds pulse count	wait condition		wait	jump
t	1	10000	50000	pulse sending compl	.ete	КО	KO
Þ	2	20000	100000	pulse sending compl	.ete	KO	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

	PLSR HD100 HD150 K1 Y0	
 <	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
x	Cut	
È	Сору	
Ē.	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output								
Г		_							
L	data start address:	HD100	user params address:	HD150	system params:	K1	output:	YO	
L	mode:	relative y	start execute section count:	0	Config				
L	Add Delete U	Jpwards Do	ownwards						

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of reverse rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

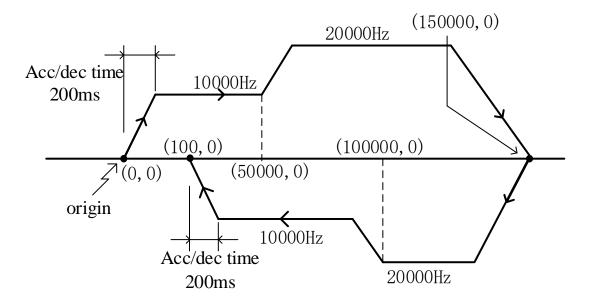
relative v start ex Upwards Downward	arams address: vecute section count: ds <u>pulse coupt</u>	HD150 system params: K1 0 Config	output: Y0	jump register				
fraquatian		moit condition						
20000	-50000	pulse sending complete pulse sending complete	KO	KO				
2 10000 -99900 pulse sending complete KO KO								
				Cancel				
1		10000 -99900 00-HD129,HD150-HD153						

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

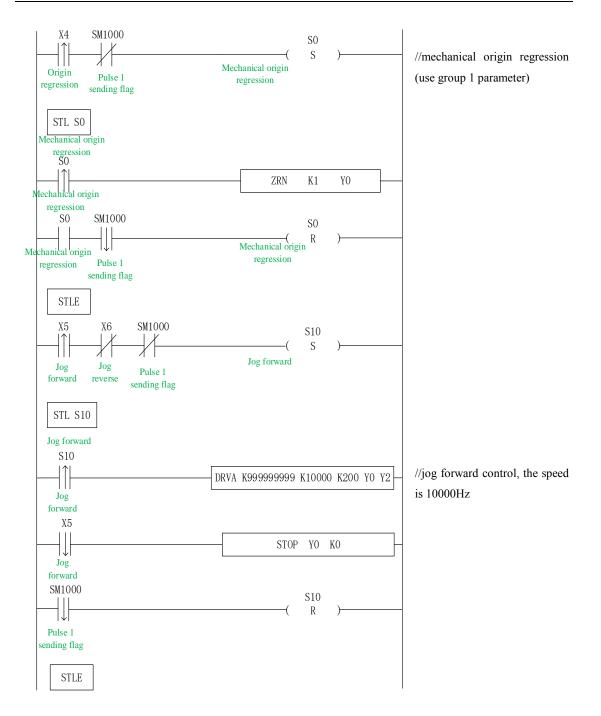
After downloading the program, power off the PLC and then re-energize it. Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

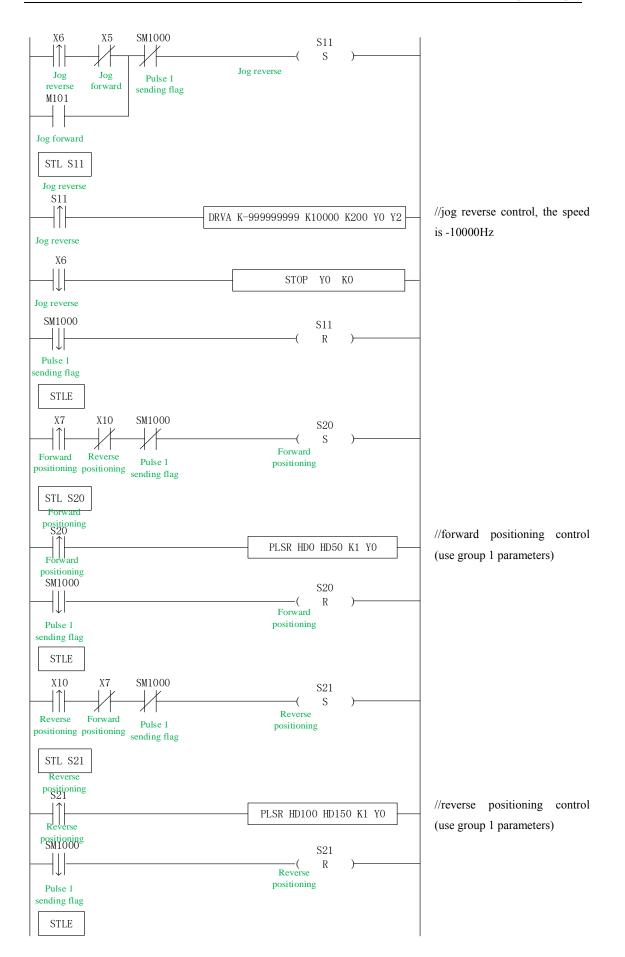
1-5-7. Forward and reverse rotation multi-segment process program **[DRVI, DRVA, PLSR, ZRN]**

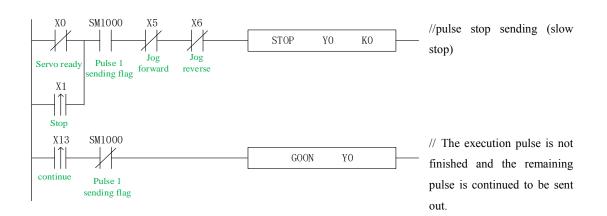
Example 1: According to the following figure, multi-segment absolute positioning mode is adopted.



Firstly, make the ladder chart as follows:







In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

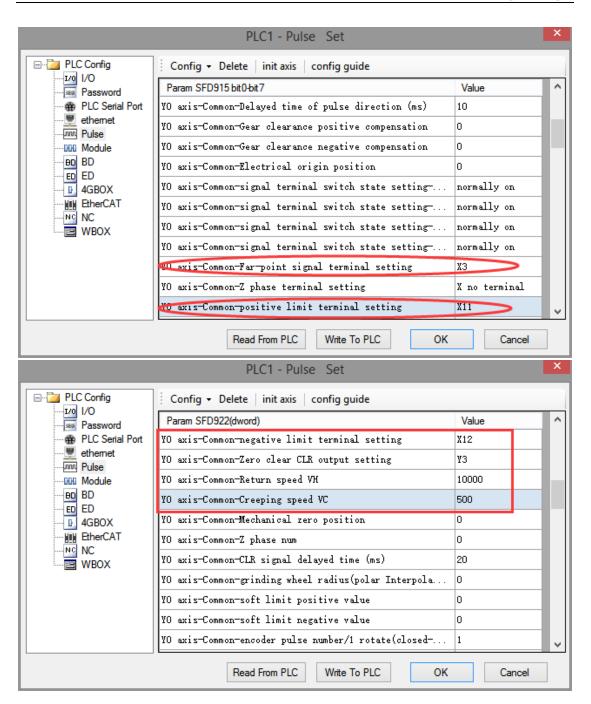
File Edit Sarch Yee Ogine Configure Opine File		Xinje PLC Progra	am Tool
Eith Eith Held I: Is Ro de the Cr we way and the state of the set	<u>File Edit Search View Online Configu</u>	ure <u>O</u> ption <u>W</u> indow <u>H</u> elp	
Project 4 × Project	📄 😅 🛃 🔏 🖻 🧊 🗘 🕻	> M 🖻 🖻 🦪 🚱 🐥 🌺 🎓 💶 🔒 🍰 🛱 🛄 🔯 📼	
Proced Code Ladder Ladder Ladder Princ Block Config Block Sexpence Block Config Block Sexpence Block Price Block Config Price Block Config Block Price Block Price Block Price Block Price Block Config Block Price Block <			Ld m0 💼
PLC1 Idder H, instruction Litt Free Monitor Code Comment Editor Free Monitor Config Block Sequence Block Comment Editor Free Monitor Set Reg Int Value PLC Config Config - Delete init axis config guide PLC Config Config - Delete init axis config guide PLC Serial Port PLC Serial Port PLC Serial Port Set Reg Int Value PLC Serial Port PLC Serial Port Set Reg Int Value Set Reg Int Value PLC Serial Port Set Reg Int Value Set Reg Int Set Reg Int Value Set Reg Int Value Set Reg Int		PLC1 - Ladder	
Code Lader Lader Func Block Comment Edtor Free Montor Sequence Block Comment Edtor Free Nontor Data Montor RCC Config PLC Service PLC Se			
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Image: seture block Config Block Sequence Block Config Block Sequence Block Config Block Sequence Block Config Config Pres Montor Sequence Block Config PLC Sential Both Module		0	
Func Block Config Block Sequence Block Comment Editor Free Montor Baba Montor Set Reg Int Value PLC Config Password PLC Senal Boot Module BD Set Benet Module BD Set Benet Set Reg Int Value Password PLC Senal Boot Set Reg Int Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Value Password PLC Senal Boot Set Reg Int Value Plo Set Reg Int Value Value Proceeding Read From PLC Write To PLC OK Cancel Information Information Read From PLC OK Cancel			
Config Block Sequence Block Sequence Block Prese Montor Bab Details Bab Details <td></td> <td></td> <td></td>			
Sequence Block Comment Eddor Preve Montor Data Montor Data Montor Set Reg int Value PLC Serial Port Set Reg int Value Set Reg int Value PLC Serial Port Set Reg int Value Pluse Set Reg int Value Set Reg int Value PLC Serial Port Set Reg int Value Pluse Set Reg int Value Set Reg int Value <td></td> <td></td> <td></td>			
Comment Editor Pres Monitor Data Monitor </td <td></td> <td></td> <td></td>			
Data Montor Set Reg Int Value PLC Soring PLC Soring PLC Sorial Port PLC Port PLC Port Details PLC Port Details PLC Port Details PLC Port Details		PLC1 - Pulse Set	
Image: Set Reg hit Value Image: Volume Image: Volume Image: Volume Image: Provide Provid			
Pressword PC Serial Port PLC Serial Port Persen Puise Persen Poise Poise Poise Poise <td></td> <td></td> <td></td>			
Image: PLC Serial Port Image: PLC Serial Po			
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PLC Serial Port Puise Ge B0 Ge Ge Ge B0 Ge G		- athemat	
Image: statement Image: statement Image: statement	L.m.		
Image: Pulse Image: CPU Pulse Image: CPU Pulse			
Image: CPU Details Image: CPU Details			
Image: BD Image: BD Image: BD			
Image: Second			
Image: description of the second s			
Image: WBOX Image: WBOX <t< td=""><td>4GBOX</td><td>i i i i i i i i i i i i i i i i i i i</td><td></td></t<>	4GBOX	i i i i i i i i i i i i i i i i i i i	
WBOX PC Status PC CVD betal PC Details PE DD Details PC Scan Cycle Cock Details PC Tor Details			
CPU Details			
Og CPU Detail Read From PLC Write To PLC OK Cancel Bit BD Details Read From PLC Write To PLC OK Cancel O Scan Cycle Clock Details Information W Error Details Information			
Mode Expansion Details Read From PLC Write To PLC OK Cancel Mode BD Details Cancel Concel Concel Concel Cock Details Information Concel Concel Concel			
BD Details Head nom FL Vinte to FL OK Cancel BD Details Scan Cycle Information Error Details Information			
ED Details Scan Cycle G Clock Details Horror Details		Read From PLC Write To PLC OK Cancel	
C Scan Cycle G Clock Details W Error Details			
O Clock Details Information ₩ Error Details Information			
₩ Error Details			
	Record	Error List Output	

Click config, then select Y0 axis.

_	PLC	1 - Pulse Set		×
PLC Corfig		it axis config guide	Value	
	Read Fro	om PLC Write To PLC	OK Cancel	

In the parameter configuration table, configure as follows (circled parameters need to be modified):

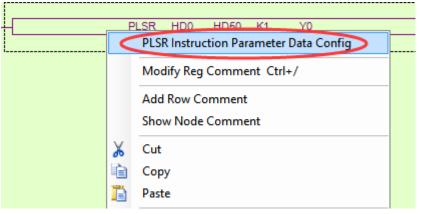
	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete init axis config guide		
Password	Param SFD906	Value	^
PLC Serial Port	YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
ethemet	YO axis-Common-Parameters setting-Pulse unit	pulse number	
	YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
ED ED	YO axis-Common-pulse send mode	complete mode	
B 4GBOX	YO axis-Common-Pulse num (1)	1	
EtherCAT	YO axis-Common-Offset (1)	1	
NC WBOX	10 axis-Common-Pulse direction terminal	¥2	
	YO axis-Common-Delayed time of pulse direction (ms)	10	
	YO axis-Common-Gear clearance positive compensation	0	
	YO axis-Common-Gear clearance negative compensation	0	
	YO axis-Common-Electrical origin position	0	_
	Read From PLC Write To PLC OK	Cancel	



	PLC1 - Pulse Set		×		
PLC Config	Config 👻 Delete init axis config guide				
I/O Password	Param SFD962	Value	^		
PLC Serial Port	YO axis-Common-Positioning completion time limit (ms	0			
ethemet	YO axis-group 1-Pulse default speed	10000			
Module	YO axis-group 1-Acceleration time of Pulse default s	200			
BD BD	YO axis-group 1-Deceleration time of pulse default s	200			
- J 4GBOX	YO axis-group 1-Acceleration and deceleration time (ms) 10				
EtherCAT	YO axis-group 1-pulse acc/dec mode	linear acc/dec			
	YO axis-group 1-Max speed	200000			
	YO axis-group 1-Initial speed	500			
	YO axis-group 1-stop speed	500			
	YO axis-group 1-FOLLOW performance param(1-100)	10			
	YO axis-group 1-FOLLOW forward compensation(0-100)	0	~		
	Read From PLC Write To PLC OK	Cancel			

After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":



In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

	multi section pulse output										
data start addre mode:	absolut V start	params address: execute section count:	HD50 0	system params:	K1	output:	YO				
Add Delete	Upwards Downwa		wait condition	_	wa regi		jump register				

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

data start mode:		execute section count:	HD50 system params: K1	output: Y0	
	Delete Upwards Downwa				
<u> </u>		pulse count	wait condition	wait register	iumn register
		50000	pulse sending complete	KO	KO
▶ 2	20000	150000	pulse sending complete	KO	KO
L					

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

	PLSR HD100 HD150 K1 Y0	
 <	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
Х	Cut	
È	Сору	
Ð	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "absolute" (default is "relative"), as shown in the following figure:

		multi se	ction pu	lse output				x
data start address:	HD100	user params address:	HD150	system params:	K1	output:	YO	
mode:	absolut 🗸	start execute section count:	0	Config				
Add Delete U	Jpwards Do	ownwards	1	1			1	

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

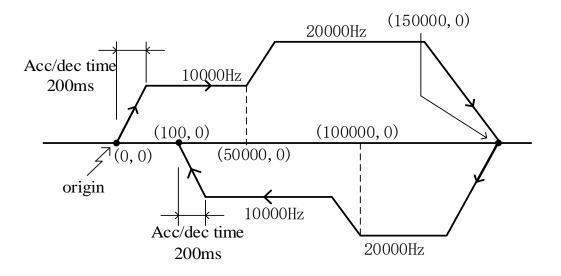
data start a mode:		rams address: ecute section count:	HD150 system params: K1 0 Config	output: Y0	
Add De	elete Upwards Downward	ds			
	frequence	pulse count	wait condition	wait register	jump rogistor
1	20000	100000	pulse sending complete	KO	KO
▶ 2	10000	100	pulse sending complete	KO	KO
			1		

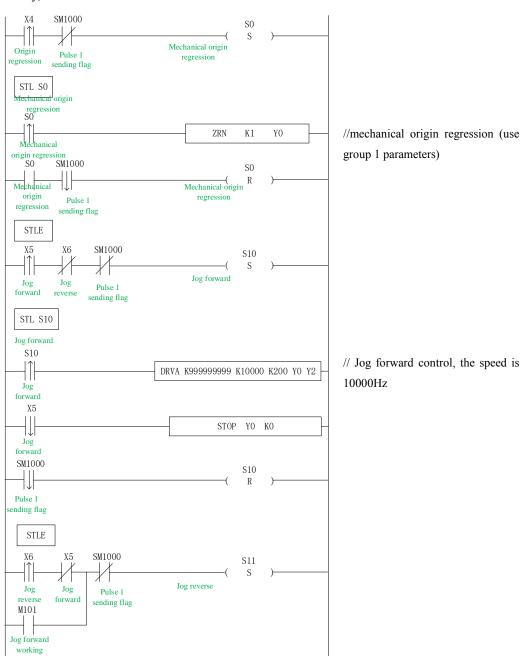
Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

After downloading the program, power off the PLC and then re-energize it.

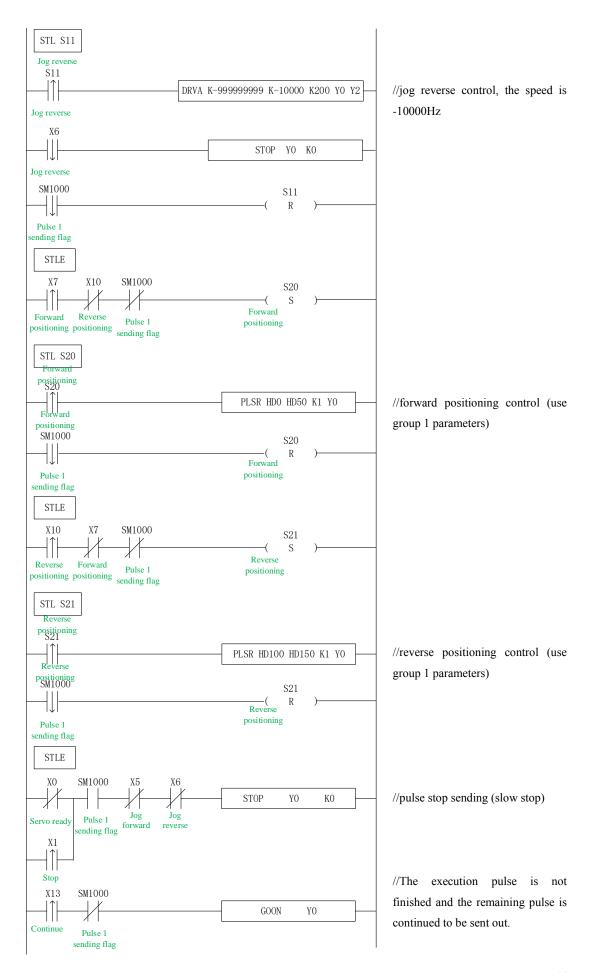
Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

Example 2: According to the following figure, multi-segment relative positioning method is used.





Firstly, make the ladder chart as follows:



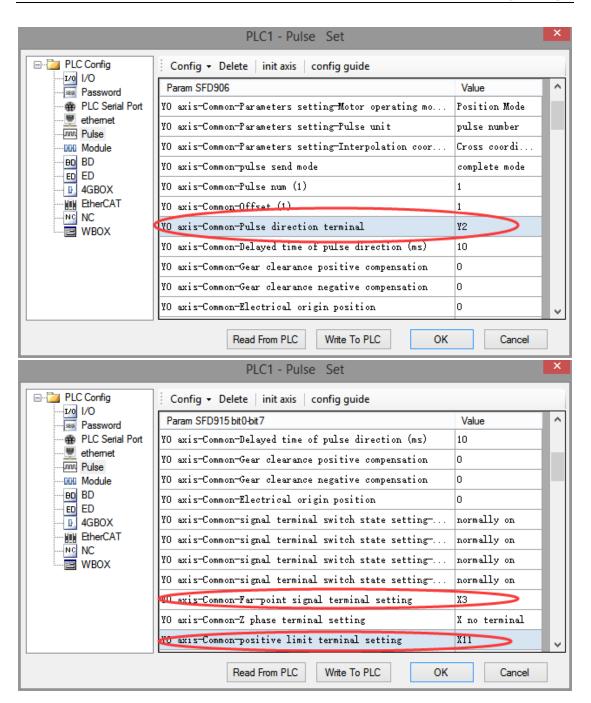
In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

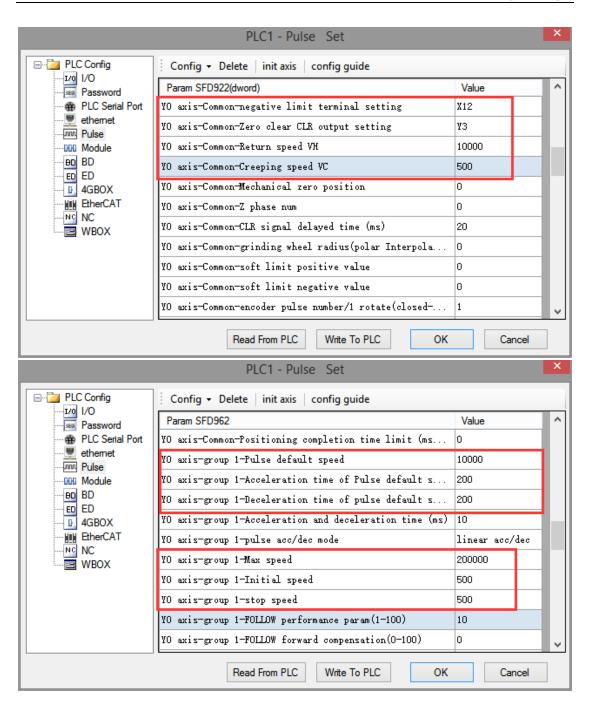
T	Xinje	PLC Program Tool
<u>File Edit Search View Online Configur</u>	re <u>O</u> ption <u>W</u> indow <u>H</u> elp	
📄 😅 📕 👗 🖻 🧯 🗘 🕸	> M 🖻 🖻 🦪 🔇 🐣 🌺 🍙 💶 🔒 🍰 🛤 🔯 🗟 🗮	
HH [112] # HH HHH HH - H - H - HH - HH Ins sIns Del sDel F5 F6 sF5 sF6	┼ < > <	Q 🚰 Ld m0 👼
Project 4 ×	PLC1 - Ladder	
Project		
E PLC1		
Code	0	
d Instruction List		
Func Block		
Config Block		
S Sequence Block		
Comment Editor	PLC1 - Pulse Set	
- 📴 Free Monitor		7
	□-□ PLC Config Config Confi	
Set Reg Init Value	Param Value	41
E-E Config	PLC Serial Port	41
Password	ethemet	41
PLC Serial Port		41
ethernet	-B0 BD	41
Pulse	ED ED	41
	4GBOX	41
BD BD	HIN EtherCAT	41
ED ED		41
B. 4GBOX		41
EtherCAT		41
NC		41
WBOX		41
E-I PLC Status		41
Expansion Details		-
BD Details	Read From PLC Write To PLC OK Cancel	
ED Details		
Scan Cycle		
Clock Details		
	Information	
- B Record	Error List Output	

Click config, then select Y0 axis.

	PLC	1 - Pulse Set		×
PLC Config	Config - Delete i	nit axis 🛛 config guide		
Password	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
GBOX	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Cance	4

In the parameter configuration table, configure as follows (circled parameters need to be modified):





After configuring the parameters of the system parameter block, click the "Write to PLC" button to write the parameters into the PLC. Since the PLSR is used as the multi-segment pulse output instruction, we also need to configure the parameters of the pulse segment (the output frequency and the number of pulses per pulse segment).

Firstly, right-click on the forward positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

 P	LSR HD0 HD50 K1 Y0	
 <	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
Ж	Cut	
è	Сору	
Ē.	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output						×		
Г									
L	data start address:	HD0	user params address:	HD50	system params:	K1	output:	YO	
	mode:	relative 🗸	start execute section count:	0	Config				
	Add Delete U	Jpwards Do	ownwards						

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

nod			ecute section count:	0 Config			
Ac	dd Del	ete Upwards Downwar frequence	ds pulse count	wait condition		wait	jump
t	1	10000	50000	pulse sending compl	.ete	КО	KO
Þ	2	20000	100000	pulse sending compl	.ete	KO	KO

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD0-HD29, and the range of system parameter block address is HD50-HD53, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

	PLSR HD100 HD150 K1 Y0	
 <	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
x	Cut	
È	Сору	
Ē	Paste	

In the open multi-segment pulse output configuration table, select "mode" as "relative" (default is "relative"), as shown in the following figure:

	multi section pulse output						×		
Г									
L	data start address:	HD100	user params address:	HD150	system params:	K1	output:	YO	
L	mode:	relative y	start execute section count:	0	Config				
	Add Delete Upwards Downwards								

After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of reverse rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

		multi se	ction pulse output		
data start add mode:		rams address: ecute section count:	HD150 system params: K1 0 Config	output: Y0	
Add Dele	ete Upwards Downward	ds	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
	fraguaraa	pulso count	woit condition	wait	յատթ
1	20000	-50000	pulse sending complete	register KO	register KO
▶ 2	10000	-99900	pulse sending complete	KO	KO
used space:	HD100-HD129,HD150-HD	153	Read From PLC Write To PLC	OK	Cancel

Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address is not beyond the range. If the range exceeds, the error of pulse output will occur.

After downloading the program, power off the PLC and then re-energize it. Positive Limit (X11) and Negative Limit (X12) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

1-6. Pulse Output Coil and Register

Pulse output flag bit:

Coil	Function	Notes	
SM1000	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1001	Direction flag	output is ON	
	Overflow flag of		
SM1002	accumulated pulse number	1 is overflow	PULSE_1
	Overflow flag of		
	accumulated pulse		
SM1003	equivalent	1 is overflow	
SM1010	Pulse error flag	ON is error	
SM1020	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1021	Direction flag	output is ON	
	Overflow flag of		
SM1022	accumulated pulse number	1 is overflow	PULSE_2
	Overflow flag of		
	accumulated pulse		
SM1023	equivalent	1 is overflow	
SM1030	Pulse error flag	ON is error	
SM1040	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1041	Direction flag	output is ON	
	Overflow flag of		
SM1042	accumulated pulse number	1 is overflow	PULSE_3
	Overflow flag of		
	accumulated pulse		
SM1043	equivalent	1 is overflow	
SM1050	Pulse error flag	ON is error	
SM1060	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1061	Direction flag	output is ON	
	Overflow flag of		
SM1062	accumulated pulse number	1 is overflow	PULSE_4
	Overflow flag of		
	accumulated pulse		
SM1063	equivalent	1 is overflow	
SM1070	Pulse error flag	ON is error	

SM1080	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1081	Direction flag	output is ON	
	Overflow flag of		
SM1082	accumulated pulse number	1 is overflow	PULSE_5
	Overflow flag of		
	accumulated pulse		
SM1083	equivalent	1 is overflow	
SM1090	Pulse error flag	ON is error	
SM1100	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1101	Direction flag	output is ON	
	Overflow flag of		
SM1102	accumulated pulse number	1 is overflow	PULSE_6
	Overflow flag of		
	accumulated pulse		
SM1103	equivalent	1 is overflow	
SM1110	Pulse error flag	ON is error	
SM1120	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1121	Direction flag	output is ON	
	Overflow flag of		
SM1122	accumulated pulse number	1 is overflow	PULSE_7
	Overflow flag of		
	accumulated pulse		
SM1123	equivalent	1 is overflow	
SM1130	Pulse error flag	ON is error	
SM1140	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1141	Direction flag	output is ON	
	Overflow flag of		
SM1142	accumulated pulse number	1 is overflow	PULSE_8
	Overflow flag of		
	accumulated pulse		
SM1143	equivalent	1 is overflow	
SM1150	Pulse error flag	ON is error	
SM1160	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1161	Direction flag	output is ON	
	Overflow flag of		PULSE_9
SM1162	accumulated pulse number	1 is overflow	
	Overflow flag of		
SM1163	accumulated pulse	1 is overflow	

	equivalent		
SM1170	Pulse error flag	ON is error	
SM1180	Pulse sending flag	1 is pulse sending	
		1 is positive direction, related direction	
SM1181	Direction flag	output is ON	
	Overflow flag of		
SM1182	accumulated pulse number	1 is overflow	PULSE_10
	Overflow flag of		
	accumulated pulse		
SM1183	equivalent	1 is overflow	
SM1190	Pulse error flag	ON is error	

Pulse output related sepcial registers:

Register	Function	Notes	
	Present segment		
SD1000	(represents segment n)		
SD1001			
	Present pulse number		
	low 16-bit (the unit is		
SD1002	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1003	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1004	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1005	pulse equivalent)		
	Present pulse number		DULCE 1
	low 16-bit (the unit is		PULSE_1
SD1006	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1007	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1008	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1009	pulse equivalent)		
		1: pulse data segment configuration error	
		2: In equivalent mode, the number of pulses	
SD1010	Pulse error information	per rotation and the movement per rotation is	
		0	
		3: System parameter block number error	

	1		
		4: Pulse parameter block number exceeding	
		maximum limit	
		5: Stop after encountering positive limit signal	
		6: Stop after meeting the negative limit signal	
		10: No origin signal is set for origin regression	
		11:Velocity of origin regression VH is 0	
		12: Origin regression crawling speed VC is 0	
		or VC≥VH	
		13: Origin regression signal error	
		15:Follow Performance Parameters ≤ 0	
		or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio ≤ 0 or >100	
		20: Interpolation Direction Terminal Not Set	
		or Set Error	
		21: The default maximum interpolation speed	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24:Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		position is (0, 0)	
		26: Control block allocation failed	
	Error pulse data block		
SD1011	number		
	Present segment		
SD1020	(represents segment n)		
SD1021			
	Present pulse number		
	low 16-bit (the unit is		
SD1022	pulse number)		
	Present pulse number		
GD1000	high 16-bit (the unit is		
SD1023	pulse number)		PULSE_2
	Present pulse number		_
SD1024	low 16-bit (the unit is		
SD1024	pulse equivalent)		
	Present pulse number high 16-bit (the unit is		
SD1025	pulse equivalent)		
501025	Present pulse number		
	low 16-bit (the unit is		
SD1026	pulse number)		
501020	puise number)		

SD1027	Present pulse number high 16-bit (the unit is pulse number)		
SD1027	1 /		
	Present pulse number low 16-bit (the unit is		
SD1028	pulse equivalent)		
SD1028	Present pulse number		
	high 16-bit (the unit is		
SD1029	pulse equivalent)		
5D1029	puise equivalent)	1: pulse data segment configuration error	
		1 6 6	
		2: In equivalent mode, the number of pulses	
		per rotation and the movement per rotation is	
		0	
		3: System parameter block number error	
		4: Pulse parameter block number exceeding	
		maximum limit	
		5: Stop after encountering positive limit signal	
		6: Stop after meeting the negative limit signal	
		10: No origin signal is set for origin regression	
		11:Velocity of origin regression VH is 0	
		12: Origin regression crawling speed VC is 0	
		or VC≥VH	
		13: Origin regression signal error	
		15: Follow Performance Parameters ≤ 0	
SD1030	Pulse error information	or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio ≤ 0 or >100	
		20: Interpolation Direction Terminal Not Set	
		or Set Error	
		21: The default maximum interpolation speed	
		is 0	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24:Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		position is (0, 0)	
		26: Control block allocation failed	
	Error pulse data block		
SD1031	number		
	Present segment		
SD1040	(represents segment n)		PULSE 3
SD1041			10135_3
SD1042	Present pulse number		

low 16-bit (the unit is pulse number) Present pulse number high 16-bit (the unit is SD1043	
Present pulse number high 16-bit (the unit is	
high 16-bit (the unit is	
SD1043 pulse number)	
Present pulse number	
low 16-bit (the unit is	
SD1044 pulse equivalent)	
Present pulse number	
high 16-bit (the unit is	
SD1045 pulse equivalent)	
Present pulse number	
low 16-bit (the unit is	
SD1046 pulse number)	
Present pulse number	
high 16-bit (the unit is	
SD1047 pulse number)	
Present pulse number	
low 16-bit (the unit is	
SD1048 pulse equivalent)	
Present pulse number	
high 16-bit (the unit is	
SD1049 pulse equivalent)	
1: pulse data segment configuration error	
2: In equivalent mode, the number of pulses	
per rotation and the movement per rotation is	
0	
3: System parameter block number error	
4: Pulse parameter block number exceeding	
maximum limit	
5: Stop after encountering positive limit signal	
6: Stop after meeting the negative limit signal	
10: No origin signal is set for origin regression	
11:Velocity of origin regression VH is 0	
SD1050 Pulse error information 12: Origin regression crawling speed VC is 0	
SD1050 Turse error mormation 12 . Origin regression crawing speed vie is 0 or VC \geq VH	
13: Origin regression signal error	
15:Follow Performance Parameters ≤ 0	
or >100	
16:Follow Feedforward Compensation <0	
or>100	
17:Follow Multiplication Coefficient and	
Division Coefficient Ratio ≤ 0 or >100	
20: Interpolation Direction Terminal Not Set	
or Set Error	
21: The default maximum interpolation speed	

			1
		is 0	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24:Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		position is (0, 0)	
		26: Control block allocation failed	
	Error pulse data block		
SD1051	number		
	Present segment		
SD1060	(represents segment n)		
SD1061			
	Present pulse number		
	low 16-bit (the unit is		
SD1062	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1063	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1064	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1065	pulse equivalent)		
	Present pulse number		
004044	low 16-bit (the unit is		
SD1066	pulse number)		PULSE 4
	Present pulse number		10202_1
GD10(7	high 16-bit (the unit is		
SD1067	pulse number)		
	Present pulse number		
SD1068	low 16-bit (the unit is		
501008	pulse equivalent)		
	Present pulse number high 16-bit (the unit is		
SD1069	pulse equivalent)		
501009	puise equivalent)	1: pulse data segment configuration error	
		2: In equivalent mode, the number of pulses	
		per rotation and the movement per rotation is	
		0	
SD1070	Pulse error information	3: System parameter block number error	
		4: Pulse parameter block number exceeding	
		maximum limit	
		5: Stop after encountering positive limit signal	
		6: Stop after meeting the negative limit signal	
		o. Stop after meeting the negative limit signal	

			1
		10: No origin signal is set for origin regression	
		11:Velocity of origin regression VH is 0	
		12: Origin regression crawling speed VC is 0	
		or VC \geq VH	
		13: Origin regression signal error	
		15:Follow Performance Parameters ≤ 0	
		or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio ≤ 0 or >100	
		20: Interpolation Direction Terminal Not Set	
		or Set Error	
		21: The default maximum interpolation speed	
		is 0	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24:Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		-	
		position is (0, 0)	
	Error miles data hist	26: Control block allocation failed	
SD1071	Error pulse data block number		
5010/1			
	Present segment		
SD1080	(represents segment n)		
SD1081			
	Present pulse number		
	low 16-bit (the unit is		
SD1082	pulse number)		
	Present pulse number		
051055	high 16-bit (the unit is		
SD1083	pulse number)		
	Present pulse number		
SD1084	low 16-bit (the unit is pulse equivalent)		
501004	Present pulse number		
	high 16-bit (the unit is		
SD1085	pulse equivalent)		
	Present pulse number		
	low 16-bit (the unit is		
SD1086	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1087	pulse number)		
SD1088	Present pulse number		PULSE 5
521000	riesent pulse number		10L0L_J

	low 16 hit (the unit is		
	low 16-bit (the unit is pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1089	pulse equivalent)		
501007		1: pulse data segment configuration error	
		2: In equivalent mode, the number of pulses	
		•	
		per rotation and the movement per rotation is	
		0	
		3: System parameter block number error	
		4: Pulse parameter block number exceeding	
		maximum limit	
		5: Stop after encountering positive limit signal	
		6: Stop after meeting the negative limit signal	
		10: No origin signal is set for origin regression	
		11:Velocity of origin regression VH is 0	
		12: Origin regression crawling speed VC is 0	
		or VC≥VH	
		13: Origin regression signal error	
SD1090	Pulse error information	15:Follow Performance Parameters ≤ 0	
		or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio ≤ 0 or >100	
		20: Interpolation Direction Terminal Not Set	
		or Set Error	
		21: The default maximum interpolation speed	
		is 0	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24:Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		position is (0, 0)	
		•	
	Emer - 1. 1. 1. 1.	26: Control block allocation failed	
SD1001	Error pulse data block		
SD1091	number		
	Present segment		
SD1100	Present segment (represents segment n)		
SD1100 SD1101			
501101	Present pulse number		
	low 16-bit (the unit is		PULSE_6
SD1102	pulse number)		
501102	Present pulse number		
SD1103	high 16-bit (the unit is		
501105	mgn 10-01 (une unit 18		

pulse number)	
Present pulse number	
low 16-bit (the unit is	
SD1104 pulse equivalent)	
Present pulse number	
high 16-bit (the unit is	
SD1105 pulse equivalent)	
Present pulse number	
low 16-bit (the unit is	
SD1106 pulse number)	
Present pulse number	
high 16-bit (the unit is	
SD1107 pulse number)	
Present pulse number	
low 16-bit (the unit is	
SD1108 pulse equivalent)	
Present pulse number	
high 16-bit (the unit is	
SD1109 pulse equivalent)	1: pulse data segment configuration error
SD1110 Pulse error information	2: In equivalent mode, the number of pulses per rotation and the movement per rotation is 0 3: System parameter block number error 4: Pulse parameter block number exceeding maximum limit 5: Stop after encountering positive limit signal 6: Stop after meeting the negative limit signal 10: No origin signal is set for origin regression 11: Velocity of origin regression VH is 0 12: Origin regression crawling speed VC is 0 or VC \geq VH 13: Origin regression signal error 15: Follow Performance Parameters ≤ 0 or >100 16: Follow Feedforward Compensation <0 or>100 17: Follow Multiplication Coefficient and Division Coefficient Ratio ≤ 0 or >100 20: Interpolation Direction Terminal Not Set or Set Error 21: The default maximum interpolation speed is 0

24.Three point Are Date	Error
24:Three-point Arc Data	
25: In polar coordinate	e mode, the current
position is (0, 0)	
26: Control block allocati	on failed
Error pulse data block	
SD1111 number	
Present segment	
SD1120 (represents segment n)	
SD1121	
Present pulse number	
low 16-bit (the unit is	
SD1122 pulse number)	
Present pulse number	
high 16-bit (the unit is	
SD1123 pulse number)	
Present pulse number	
low 16-bit (the unit is	
SD1124 pulse equivalent)	
Present pulse number	
high 16-bit (the unit is	
SD1125 pulse equivalent)	
Present pulse number	
low 16-bit (the unit is	
SD1126 pulse number)	
Present pulse number	
high 16-bit (the unit is	
SD1127 pulse number)	
Present pulse number	
low 16-bit (the unit is	PULSE_7
SD1128 pulse equivalent)	
Present pulse number	
high 16-bit (the unit is	
SD1129 pulse equivalent)	
1: pulse data segment con	figuration error
	-
2: In equivalent mode, t	-
per rotation and the mov	rement per rotation is
0	
3: System parameter bloc	k number error
4: Pulse parameter bloc	k number exceeding
SD1130 Pulse error information maximum limit	
5: Stop after encountering	positive limit signal
6: Stop after meeting the	-
10: No origin signal is set	
11:Velocity of origin regr	
	wling speed VC is 0
12: Origin regression cra	8 - F - F - F - F - F - F - F - F - F -

		12: Origin regression signal arrow	
		13: Origin regression signal error	
		15:Follow Performance Parameters ≤ 0	
		or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio ≤ 0 or >100	
		20: Interpolation Direction Terminal Not Set	
		or Set Error	
		21: The default maximum interpolation speed	
		is 0	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24:Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		position is (0, 0)	
		26: Control block allocation failed	
	Error pulse data block		
SD1131	number		
	Present segment		
SD1140	(represents segment n)		
SD1141			
	Present pulse number		
SD1142	low 16-bit (the unit is pulse number)		
501142	Present pulse number		
	high 16-bit (the unit is		
SD1143	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1144	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1145	pulse equivalent)		
	Present pulse number		
SD1146	low 16-bit (the unit is pulse number)		
501140	Present pulse number		
	high 16-bit (the unit is		
SD1147	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1148	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1149	pulse equivalent)		PULSE_8

		1: pulse data segment configuration error	
		2: In equivalent mode, the number of pulses	
		per rotation and the movement per rotation is	
		0	
		3: System parameter block number error	
		4: Pulse parameter block number exceeding	
		maximum limit	
		5: Stop after encountering positive limit signal	
		6: Stop after meeting the negative limit signal	
		10: No origin signal is set for origin regression	
		11:Velocity of origin regression VH is 0	
		12: Origin regression crawling speed VC is 0	
		or VC≥VH	
		13: Origin regression signal error	
		15:Follow Performance Parameters ≤ 0	
SD1150	Pulse error information	or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio ≤ 0 or >100	
		20: Interpolation Direction Terminal Not Set	
		or Set Error	
		21: The default maximum interpolation speed	
		is 0	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24:Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		position is (0, 0)	
		26: Control block allocation failed	
	Error pulse data block		
SD1151	number		
	Present segment		
SD1160	(represents segment n)		
SD1161			
	Present pulse number		
	low 16-bit (the unit is		
SD1162	pulse number)		PULSE_9
	Present pulse number		
SD1162	high 16-bit (the unit is pulse number)		
SD1163	1 /		
	Present pulse number low 16-bit (the unit is		
SD1164	pulse equivalent)		
501104	puise equivalent)		

	Present pulse number	
	high 16-bit (the unit is	
SD1165	pulse equivalent)	
	Present pulse number	
	low 16-bit (the unit is	
SD1166	pulse number)	
	Present pulse number	
	high 16-bit (the unit is	
SD1167	pulse number)	
	Present pulse number	
	low 16-bit (the unit is	
SD1168	pulse equivalent)	
	Present pulse number	
	high 16-bit (the unit is	
SD1169	pulse equivalent)	
	· · ·	1: pulse data segment configuration error
		2: In equivalent mode, the number of pulses
		per rotation and the movement per rotation is
		0
		`
		3: System parameter block number error
		4: Pulse parameter block number exceeding
		maximum limit
		5: Stop after encountering positive limit signal
		6: Stop after meeting the negative limit signal
		10: No origin signal is set for origin regression
		11:Velocity of origin regression VH is 0
		12: Origin regression crawling speed VC is 0
		or VC≥VH
		13: Origin regression signal error
SD1170	Pulse error information	15:Follow Performance Parameters ≤ 0
521170		or >100
		16:Follow Feedforward Compensation <0
		or>100
		17:Follow Multiplication Coefficient and
		Division Coefficient Ratio ≤ 0 or >100
		20: Interpolation Direction Terminal Not Set
		or Set Error
		21: The default maximum interpolation speed
		is 0
		22: Arc interpolation data error
		23: Arc radius data error
		24:Three-point Arc Data Error
		25: In polar coordinate mode, the current
		position is $(0, 0)$
		26: Control block allocation failed
001171	T 1 1 1 1	
SD1171	Error pulse data block	

	number		
	Present segment		
SD1180	(represents segment n)		
SD1181			
	Present pulse number		
	low 16-bit (the unit is		
SD1182	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1183	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1184	pulse equivalent)		
	Present pulse number		
000110-	high 16-bit (the unit is		
SD1185	pulse equivalent)		
	Present pulse number		
0D1107	low 16-bit (the unit is		
SD1186	pulse number)		
	Present pulse number		
SD1187	high 16-bit (the unit is pulse number)		
SD1107	Present pulse number		
	low 16-bit (the unit is		
SD1188	pulse equivalent)		PULSE-
501100	Present pulse number		10
	high 16-bit (the unit is		_
SD1189	pulse equivalent)		
		1: pulse data segment configuration error	
		2: In equivalent mode, the number of pulses	
		per rotation and the movement per rotation is	
		0	
		3: System parameter block number error	
		4: Pulse parameter block number exceeding maximum limit	
		5: Stop after encountering positive limit signal	
SD1190	Pulse error information	6: Stop after meeting the negative limit signal	
		10: No origin signal is set for origin regression	
		11:Velocity of origin regression VH is 0	
		12: Origin regression crawling speed VC is 0	
		or VC≥VH	
		13: Origin regression signal error	
		15:Follow Performance Parameters ≤ 0	
		or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
	1		

		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio ≤ 0 or >100	
		20: Interpolation Direction Terminal Not Set	
		or Set Error	
		21: The default maximum interpolation speed	
		is 0	
		22: Arc interpolation data error	
		23: Arc radius data error	
		24: Three-point Arc Data Error	
		25: In polar coordinate mode, the current	
		position is (0, 0)	
		26: Control block allocation failed	
	Error pulse data block		
SD1191	number		

High speed pulse special data register HSD (power off memory)

Register	Function	Note	
	Low 16 bits of cumulative pulse (the unit is		
HSD0	pulse number)		
	High 16 bits of cumulative pulse (the unit is		
HSD1	pulse number)		
	Low 16 bits of cumulative pulse (the unit is		
HSD2	pulse equivalent)		
	High 16 bits of cumulative pulse (the unit is		
HSD3	pulse equivalent)		PULSE_1
	Low 16 bits of cumulative pulse (the unit is		
HSD4	pulse number)		
	High 16 bits of cumulative pulse (the unit is		
HSD5	pulse number)		
	Low 16 bits of cumulative pulse (the unit is		
HSD6	pulse equivalent)		
	High 16 bits of cumulative pulse (the unit is		
HSD7	pulse equivalent)		PULSE_2
	Low 16 bits of cumulative pulse (the unit is		
HSD8	pulse number)		
	High 16 bits of cumulative pulse (the unit is		
HSD9	pulse number)		
	Low 16 bits of cumulative pulse (the unit is		
HSD10	pulse equivalent)		
	High 16 bits of cumulative pulse (the unit is		
HSD11	pulse equivalent)		PULSE_3

		
	Low 16 bits of cumulative pulse (the unit is	
HSD12	pulse number)	
	High 16 bits of cumulative pulse (the unit is	
HSD13	pulse number)	
	Low 16 bits of cumulative pulse (the unit is	
HSD14	pulse equivalent)	
	High 16 bits of cumulative pulse (the unit is	
HSD15	pulse equivalent)	PULSE_4
	Low 16 bits of cumulative pulse (the unit is	
HSD16	pulse number)	
	High 16 bits of cumulative pulse (the unit is	
HSD17	pulse number)	
	Low 16 bits of cumulative pulse (the unit is	
HSD18	pulse equivalent)	
	High 16 bits of cumulative pulse (the unit is	
HSD19	pulse equivalent)	PULSE_5
	Low 16 bits of cumulative pulse (the unit is	
HSD20	pulse number)	
	High 16 bits of cumulative pulse (the unit is	
HSD21	pulse number)	
	Low 16 bits of cumulative pulse (the unit is	
HSD22	pulse equivalent)	
	High 16 bits of cumulative pulse (the unit is	
HSD23	pulse equivalent)	PULSE_6
	Low 16 bits of cumulative pulse (the unit is	
HSD24	pulse number)	
	High 16 bits of cumulative pulse (the unit is	
HSD25	pulse number)	
	Low 16 bits of cumulative pulse (the unit is	
HSD26	pulse equivalent)	
	High 16 bits of cumulative pulse (the unit is	
HSD27	pulse equivalent)	PULSE 7
	Low 16 bits of cumulative pulse (the unit is	
HSD28	pulse number)	
	High 16 bits of cumulative pulse (the unit is	
HSD29	pulse number)	
	Low 16 bits of cumulative pulse (the unit is	
HSD30	pulse equivalent)	
10200	High 16 bits of cumulative pulse (the unit is	
HSD31	pulse equivalent)	PULSE 8
115031	Low 16 bits of cumulative pulse (the unit is	
HSD32	pulse number)	PULSE 9
115D32	puise number)	FULSE_9

	High 16 bits of cumulative pulse (the unit is	
HSD33	pulse number)	
	Low 16 bits of cumulative pulse (the unit is	
HSD34	pulse equivalent)	
	High 16 bits of cumulative pulse (the unit is	
HSD35	pulse equivalent)	
	Low 16 bits of cumulative pulse (the unit is	
HSD36	pulse number)	
	High 16 bits of cumulative pulse (the unit is	
HSD37	pulse number)	
	Low 16 bits of cumulative pulse (the unit is	
HSD38	pulse equivalent)	
	High 16 bits of cumulative pulse (the unit is	
HSD39	pulse equivalent)	PULSE_10

2 Motion control

2-1. Motion control instruction list

Instruction	Function	Chapter
DRV	Quick positioning	2-4-1
DRVR	Quick positioning, polar coordinate mode (temporarily unavailable)	2-4-2
LIN line	Linear interpolation	2-4-3
LIN line VM	Linear interpolation, maximum speed can be specified separately	2-4-3
LIN line VBEM	Linear interpolation, can specify the starting speed, terminal speed and maximum speed separately	2-4-3
CW clockwise	Clockwise circular interpolation	2-4-4
CW closewise VM	Clockwise circular interpolation, maximum speed can be specified separately	2-4-4
CW closewise VBEM	Clockwise circular interpolation, can specify the starting speed, terminal speed and maximum speed separately	2-4-4
CCW anticlockwise	Anticlockwise circular interpolation	2-4-5
CCW anticlockwise VM	Anticlockwise circular interpolation, maximum speed can be specified separately	2-4-5
CCW anticlockwise VBEM	Anticlockwise circular interpolation, can specify the starting speed, terminal speed and maximum speed separately	2-4-5
CW_R closewise	Clockwise circular interpolation (Specified radius)	2-4-6
CW_R closewise VM	Clockwise circular interpolation(Specified radius), maximum speed can be specified separately	2-4-6
CW_R closewise VBEM	Clockwise circular interpolation(Specified radius), can specify the starting speed, terminal speed and maximum speed separately	2-4-6
CCW_R anticlockwise	Anticlockwise circular interpolation(Specified radius)	2-4-7
CCW_R anticlockwise VM	Anticlockwise circular interpolation(Specified radius), maximum speed can be specified separately	2-4-7
CCW_R anticlockwise VBEM	Anticlockwise circular interpolation(Specified radius), can specify the starting speed, terminal speed and maximum speed separately	2-4-7

The following motion control instructions are suitable for XDM, XDME, XLME series PLC.

ARC three points			Three points arc	2-4-8
ARC three point		point	Three points arc, maximum speed can be specified separately	
VM				
ARC three point		point	Three points arc, can specify the starting speed, terminal speed	
VBEM	[and maximum speed separately	
FOLLOW			Single phase follow	2-4-9
FOLLOW_AB			AB phase follow	2-4-9

Note: All interpolation instructions have no stop when jumping, there is inflection point.

2-2. Writing method of motion control instruction

Except FOLLOW, other motion control instructions must be written in the BLOCK. The specific methods are as follows:

1. insert a sequence block S

in the ladder chart, then insert G instruction.

Edit Sequence Block 1	×
Comment: Sequence Block 1 Common Item Pulse Item Wait Item Read/Write Module(FROM/TO) G Item Read/Write SD Module	
ОК Са	ncel

2. it will show the following window

] Skip RV fast pos	Params		Absolute
	Params	Register	
		Register	Absolute
•			
	final position	DO	Absolute
	final position	D2	Absolute
	axis 1	ΥО	params
	axis 2	¥1	params
		ОК	Cancel
		axis 1	axis 1 YO axis 2 Y1

3. click the dropdown menu, select the motion control instruction to

	Edit Sequence Block 1	×
Commer	G Instruction ×	
	Skip Comment: clockwise VBEM	
; Inserf	CW_R clockwise VBEM 🗸	
Index	DRV fast position DRVR fast position(polar) LIN line LIN line VM LIN line VBEM CW clockwise VM CW clockwise VM CCW anticlockwise VBEM CCW anticlockwise VM CCW anticlockwise VBEM CW_R clockwise VBEM CW_R clockwise VBEM CW_R anticlockwise VM CCW_R anticlockwise VM CCW_R anticlockwise VBEM ARC three point VM ARC three point VM ARC three point VBEM	ancel

4. click the motion control instruction CW clockwise, it will show the instruction configuration window:

	G Instruc	tion	E
Skip	Comment: clocky	wise	
CW clockwis	e		~
	Params	Register	Absolute
•	final position	DO	Absolute
	final position	D2	Absolute
	center position	D4	Relative
	center position	D6	Relative
	axis 1	YO	params
	axis 2	Υ1	params
		ОК	Cancel

In the register list, double click the value can change the register address and axis output terminal. In the absolute list, double click the value can set the mode (relative/absolute).

Double click the parameters can set the direction, speed, acc/dec time of the two axes, please see the follows:

		G Instruc	tion	×	L [
						Config - Delete init axis config guide	
С	Skip	Comment: clock	wise			Param SFD901 bit0	Value
	CW clockw	ise		~		YO axis-Common-Parameters setting-Pulse direction logic	positive logic
		_				YO axis-Common-Parameters setting-enable soft limit	disable
-		Params	Register	Absolute		YO axis-Common-Parameters setting-mechanical back to	negative
		final position	DO	Absolute	18	YO axis-Common-Parameters setting-Motor operating mo	Position Mode
		final position	D2	Absolute		YO axis-Common-Parameters setting-Pulse unit	pulse number
		center position	D4	Relative		YO axis-Common-Parameters setting-Interpolation coor	Cross coordi
L		center position	D6	Relative		YO axis-Common-pulse send mode	complete mode
L	•	axis 1	YO	params		YO axis-Common-Pulse num (1)	1
L		axis 2	¥1	params		YO axis-Common-Offset (1)	1
L						YO axis-Common-Pulse direction terminal	Y no terminal
			ОК	Cancel		YO axis-Common-Delayed time of pulse direction (ms)	10
					4	Read From PLC Write To PLC OK	Cancel

Note:

(1) Different instructions require different system parameter blocks. See chapter 2-3-2 and instructions for details.

(2) See chapter 1-2-1 for system parameters.

5. Configuration is completed, click OK, and you can see the general situation of the generated instructions in the SBLOCK:

	quence Block1 t Delete ∣Up	Edit Sequ wards Downwa	uence Block 1	
Index 1	Skip	Comment clockwise	Output CW DO D10 D20 D30 YO Y1	
			ок	Cancel

6. A complete motion control instruction is completed by generating the motion control instructions in the ladder diagram and inputting the driving conditions.

PLC1 - La	dder	$\triangleleft \triangleright \times$
0		SBLOCK Sequence Block1 - CW D0 D10 D20 D30 Y0 Y1 - SBLOCKE -

7. Execute BLOCK once every time M0 rises.

8. Multiple motion control instructions can be inserted into BLOCK. Lines and arcs can be used to fulfill different interpolation requirements.

2-3. Pulse output terminal distribution and parameters

This section will introduce the distribution of the output port of each PLC pulse in XD series and the configuration of the parameters of each axis pulse.

2-3-1. Pulse output port distribution

In all transistor output terminals of XDM series PLC, the operation axes of axle 1 and axle 2 can be arbitrarily specified, and the corresponding direction terminals can also be arbitrarily specified.

XDM-24T4

Output	Y0~Y3	Y4~Y11
Function	Pulse output	Direction output

XDM-32T4, XLME-32T4

Output	Y0~Y3	Y4~Y15
Function	Pulse output	Direction output

XDM-60T4, XDM-60T4L, XDME-60T4, XDH-60T4

Output	Y0~Y3	Y4~Y27
Function	Pulse output	Direction output

XDM-60T10, XDME-60T10

Output	Y0~Y11	Y12~Y27
Function	Pulse output	Direction output

Note: Pulse output terminals that are not used can also be used as directional terminals.

2-3-2. Pulse output terminal parameters

In order to execute the motion control command, it is necessary to configure the pulse control parameters of axis 1 and axis 2. However, only part of the pulse parameters are used in the motion control command, and part of these parameters are common parameters of two axes (i.e. the parameters configurated in axis 1 are valid). As shown in the following figure:

	Pulse direction logic	Independent	Axis 1 and 2 need to be set
		parameter	
Common	Enable soft limit	Common	Only need to set axis 1
		parameter	
parameter	Pulse unit	Common	Only need to set axis 1
		parameter	
	Pulse number	Independent	Axis 1 and 2 need to be set

		parameter	
	Offset	Independent	Axis 1 and 2 need to be set
		parameter	
	Pulse direction terminal	Independent	Axis 1 and 2 need to be set
		parameter	
	Signal terminal switch state	Independent	Axis 1 and 2 need to be set
	settingpositive limit	parameter	
	Signal terminal switch state	Independent	Axis 1 and 2 need to be set
	settingnegative limit	parameter	
	Positive limit terminal	Independent	Axis 1 and 2 need to be set
	setting	parameter	
	Negative limit terminal	Independent	Axis 1 and 2 need to be set
	setting	parameter	
	Soft limit positive value	Independent	Axis 1 and 2 need to be set
		parameter	
	Soft limit negative value	Independent	Axis 1 and 2 need to be set
		parameter	
Group 2	Pulse default speed	Common	Only need to set axis 1
parameters		parameter	
	Acceleration time of pulse	Common	Only need to set axis 1
	default speed	parameter	
	Deceleration time of pulse	Common	Only need to set axis 1
	default speed	parameter	
	Max speed	Common	Only need to set axis 1
		parameter	
	Initial speed	Common	Only need to set axis 1
	-	parameter	
	Stop speed	Common	Only need to set axis 1
		parameter	
parameters	default speed Deceleration time of pulse default speed Max speed Initial speed	Common parameter Common parameter Common parameter Common parameter Common	Only need to set axis 1 Only need to set axis 1 Only need to set axis 1

Note: The above table is applicable to all motion control instructions except DRV and DRVR.

DRV and DRVR instructions used parameters:

	v it moti detions used parameters		
	Pulse direction logic	Independent	Axis 1 and 2 need to be set
		parameter	
	Enable soft limit	Common	Only need to set axis 1
		parameter	
Common	Pulse unit	Common	Only need to set axis 1
Common		parameter	
parameters	Pulse number	Independent	Axis 1 and 2 need to be set
		parameter	
	Offset	Independent	Axis 1 and 2 need to be set
		parameter	
	Pulse direction terminal	Independent	Axis 1 and 2 need to be set

	I	noromator	
		parameter	
	Signal terminal switch state	Independent	Axis 1 and 2 need to be set
	settingpositive limit	parameter	
	Signal terminal switch state	Independent	Axis 1 and 2 need to be set
	settingnegative limit	parameter	
	Positive limit terminal setting	Independent	Axis 1 and 2 need to be set
		parameter	
	Negative limit terminal setting	Independent	Axis 1 and 2 need to be set
		parameter	
	Soft limit positive value	Independent	Axis 1 and 2 need to be set
		parameter	
	Soft limit negative value	Independent	Axis 1 and 2 need to be set
		parameter	
Group 1	Pulse default speed	Common	Axis 1 and 2 need to be set
parameters		parameter	
	Acceleration time of pulse	Common	Axis 1 and 2 need to be set
	default speed	parameter	
	Deceleration time of pulse	Common	Axis 1 and 2 need to be set
	default speed	parameter	
	Max speed	Common	Axis 1 and 2 need to be set
		parameter	
	Initial speed	Common	Axis 1 and 2 need to be set
		parameter	
	Stop speed	Common	Axis 1 and 2 need to be set
		parameter	

Note: For a detailed description of the pulse parameters, please refer to the relevant content of Chapter 1.

2-4. Motion control instruction

2-4-1. Quick positioning [DRV]

1. instruction overview

Quick positioning instructions. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Quick positi	oning [DRV]		
16-bit	-	32-bit	DRV
instruction		instruction	
Execute	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. operand

Operand	Function	Туре
S0	The target position of axis 1	Double words, 32-bit
S 1	The target position of axis 2	Double words, 32-bit
D0	Pulse output terminal of axis 1	Bit
D1	Pulse output terminal of axis 2	Bit

3. suitable soft component

Word	Operand		System Constant Module							lule			
		D^*	FD	TI)*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
Bit	Operand				Sy	stem							
		Х	Y	M*	S*	T*	C*	Dnn	ı				
	D0		•										
	- •												

* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

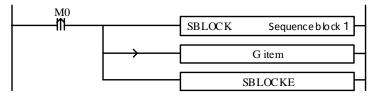
4. Parameter setting

Relative parameters	Settings	Note
Final position	Free to specify register address	Must set
Relative/ absolute	Relative: the above position as a reference;	Must set
	absolute: the origin as a reference	
Axis 1 pulse output	Free to specify pulse output terminal	Must set
port		
Axis 2 pulse output	Free to specify pulse output terminal	Must set

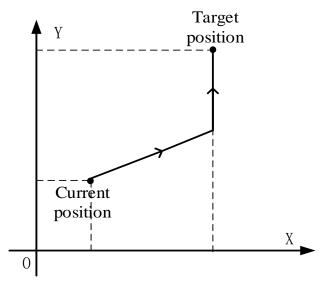
port		
Axis 1 direction port	Arbitrarily specify idle output points, set in system	Must set
	parameters	
Axis 2 direction port	Arbitrarily specify idle output points, set in system	Must set
	parameters	
Pulse unit	Setting in System Parameters of Axis 1	Must set
Pulse default speed	Specify in group 1 parameters of the system	Must set
	parameters of each axis	
Acceleration time	Specify in group 1 parameters of the system	No need to set
	parameters of each axis	
Deceleration time	Specify in group 1 parameters of the system	No need to set
	parameters of each axis	

Function and action

《Instruction format》



When the quick positioning DRV command is executed, the two axes will move rapidly from the current position to the target position at the default pulse speed set by their respective axes (when one axis is finished first, the other axis will continue to move at the default pulse speed, and then finish positioning after reaching the target position). As shown in the following figure:



DRV quick positioning

Parameter configuration

Double click G item, it will pop up the DRV configuration panel:

	G Instructio	on	×
Skip	Comment: fast posi	tion	
DRV fast position	1		*
	Params	Register	Absolute
► <mark>S0</mark>	final position	DO	Absolute
S1	final position	D2	Absolute
DO	axis 1	YO	params
D1	axis 2	¥1	params
		ОК	Cancel

Command configuration

PLC1 - Pulse Set			×
Config 👻 Delete 🛛 init axis 🔷 config guide			
Param SFD906	Valu	le	^
YO axis-Common-Parameters setting-Pulse direction logic	posi	tive logic	
YO axis-Common-Parameters setting-enable soft limit	disa	ble	
YO axis-Common-Parameters setting-mechanical back to	nega	tive	
YO axis-Common-Parameters setting Motor operating mo	Posi	tion Mode	
YO axis-Common-Parameters setting-Pulse unit	1 um		
YO axis-Common-Parameters setting-Interpolation coor	Cros	s coordi	
YO axis-Common-pulse send mode	comp	lete mode	
YO axis-Common-Pulse num (1)	1		
YO axis-Common-lum(revolve)	1		
YO axis-Common-Pulse direction terminal	¥4		
YO axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Y0 axis system parameters (1)

PLC1 - Pulse Set			×
Config 👻 Delete 🛛 init axis 🔷 config guide			
Param SFD954	Value		^
YO axis-Common-Rated speed corresponding frequency (0		
YO axis-Common-Positioning completion time limit (ms	0		
YO axis-group 1-Pulse default speed	1000		
YO axis-group 1-Acceleration time of Pulse default s	50		1
YO axis-group 1-Deceleration time of pulse default s	50		١.
YO axis-group 1-Acceleration and deceleration time (ms)	10		
YO axis-group 1-pulse acc/dec mode	linear	acc/dec	
YO axis-group 1-Max speed	100000		
YO axis-group 1-Initial speed	0		
YO axis-group 1-stop speed	0		
YO axis-group 1-FOLLOW performance param(1-100)	10		
Read From PLC Write To PLC OK		Cancel	

Y0 axis system parameters (2)

PLC1 - Pulse Set		>
Config 🝷 Delete init axis config guide		
Param SFD1036	Value	1
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	logic
¥1 axis-Common-Parameters setting-enable soft limit	disable	
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting Motor operating mo	Position	Mode
V1 axis-Common-Parameters setting-Pulse unit	1 um	
V1 axis-Common-Parameters setting-Interpolation coor		ordi
Y1 axis-Common-pulse send mode		mode
Y1 axis-Common-Pulse num (1)		
Y1 axis=Common=1um(revolve)		
V1 axis-Common-Pulse direction terminal	¥5	
Y1 axis-Common-Delayed time of pulse direction (ms)	10	
Read From PLC Write To PLC OK		Cancel

Y1 axis system parameters (1)

Config 🝷 Delete 🛛 init axis 📄 config guide		
Param SFD1084	Value	
V1 axis-Common-Rated speed corresponding frequency (0	
¥1 axis-Common-Positioning completion time limit (ms	0	
V1 axis-group 1-Pulse default speed	1000	
V1 axis-group 1-Acceleration time of Pulse default s	50	
V1 axis-group 1-Deceleration time of pulse default s	50	
Y1 axis-group 1-Acceleration and deceleration time (ms)	10	
¥1 axis-group 1-pulse acc/dec mode	linear a	.cc/dec
Y1 axis-group 1-Max speed	100000	
V1 axis-group 1-Initial speed	0	
¥1 axis-group 1-stop speed	0	
V1 axis-group 1-FOLLOW performance param(1-100)	10	

Y1 axis system parameters (2)

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is set ON for the forward pulse and set OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Position movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 500, HSD6 = 1000, D0 = 5000, D10 = 2000, when M0 rises, execute DRV instructions and move to the target position with 1000 Hz, 50ms acceleration/deceleration time, if:

(1) If the final position is absolute mode, the target position is (5000,2000);

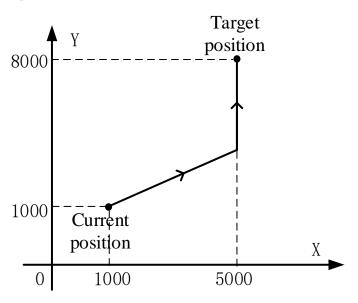
(2) When the final position is in the relative mode, the target position is (5500,3000).

• When the DRV instruction is running, the pulse flag bit corresponding to the output port Y of the DRV instruction will be set on.

Note: DRV instructions are fixed using group 1 parameters!



As shown in the figure below, the current position coordinates of the worktable are (1000,1000) and the target coordinates are (5000,8000). The two axes are Y0 and Y1, respectively. The default pulse speeds are all 5000. The acceleration and deceleration slopes are changed by 1000Hz for 30ms, and the



pulse direction terminals are Y4 and Y5. Note: The above numerical units are pulse numbers.

Ladder chart:

M0 Î	SBLOCK	Sequence block 1
	 G item	
	SI	BLOCKE

```
G item configurations:
```

	G Instructio	on	×		
Skip	Comment: fast posit	ion			
DRV fast	DRV fast position V				
	Params	Register	Absolute		
	final position	K5000	Absolute		
	final position	K8000	Absolute		
•	axis 1	YO	params		
	axis 2	Ψ1	params		
		ОК	Cancel		

Absolute mode

	G Instruction				
Skip	Comment: Fast po	sition			
DRV fast	DRV fast position				
	Params	Register	Absolute		
	final position	K4000	Relative		
•	final position	K7000	Relative		
	axis 1	YO	params		
	axis 2	¥1	params		
		ОК	Cancel		

Relative mode

Axis 1(Y0) parameters:

PLC1 - Pulse Set		×
Config 👻 Delete init axis config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting Motor operating mo Position		
YO axis-Common-Parameters setting-Pulse unit	1 นก	
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-lum(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	~
Read From PLC Write To PLC OK	Cancel	

×

Config 🝷 Delete 🛛 init axis 🛛 config guide		
Param SFD906	Value	1
YO axis-Common-Gear clearance positive compensation	0	
YO axis-Common-Gear clearance negative compensation	0	ъ
YO axis-Common-Electrical origin position	0	Ш
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-Far-point signal terminal setting	X no terminal	
YO axis-Common-Z phase terminal setting	X no terminal	
YO axis-Common-positive limit terminal setting	X no terminal	
YO axis-Common-negative limit terminal setting	X no terminal	

PLC1 - Pulse Set

Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD924(dword)	Value	^
YO axis-Common-negative limit terminal setting	X no terminal	
YO axis-Common-Zero clear CLR output setting	Y no terminal	
YO axis-Common-Return speed VH	0	_
YO axis-Common-Creeping speed VC	0	
YO axis-Common-Mechanical zero position	0	
YO axis-Common-Z phase num	0	
YO axis-Common-CLR signal delayed time (ms)	20	
YO axis-Common-grinding wheel radius(polar Interpola	0	
YO axis-Common-soft limit positive value	0	
YO axis-Common-soft limit negative value	0	
YO axis=Common=encoder pulse number/1 rotate(closed=	1	~
Read From PLC Write To PLC OK	Cancel	

Config 👻 Delete 🛛 init axis 🔷 config guide			
Param SFD963	Value	1	
YO axis-group 1-Pulse default speed	1000		
YO axis-group 1-Acceleration time of Pulse default s	30	L	
YO axis-group 1-Deceleration time of pulse default s	30	L	
YO axis-group 1-Acceleration and deceleration time (ms)	0		
YO axis-group 1-pulse acc/dec mode	linear acc/dec	١.	
YO axis-group 1-Max speed	5000		
YO axis-group 1-Initial speed	0	Ľ	
YO axis-group 1-stop speed	0	L	
YO axis-group 1-FOLLOW performance param(1-100)	50	L	
YO axis-group 1-FOLLOW forward compensation(0-100) 0			
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	Ι.	

Axis 2 (Y1) parameters:

PLC1 - Pulse Set			
Config - Delete init axis config guide			
Param SFD1105 bit0-bit1	Value	^	
Y1 axis-Common-Parameters setting-Pulse direction logic	positive logic		
V1 axis-Common-Parameters setting-enable soft limit	disable		
Y1 axis-Common-Parameters setting-mechanical back to	negative		
Y1 axis-Common-Parameters setting-Motor operating mo	Position Mode		
Y1 axis-Common-Parameters setting-Pulse unit	1 นท		
V1 axis-Common-Parameters setting-Interpolation coor	Cross coordi		
¥1 axis-Common-pulse send mode	complete mode		
Y1 axis-Common-Pulse num (1)	1		
Y1 axis-Common-1um(revolve)	1		
V1 axis-Common-Pulse direction terminal	¥5		
Y1 axis-Common-Delayed time of pulse direction (ms)	10	•	
Read From PLC Write To PLC OK Cancel			

×

Config 👻 Delete 🛛 init axis 🔤 config guide		
Param SFD1105 bit0-bit1	Value	
¥1 axis-Common-Gear clearance positive compensation	0	
Y1 axis-Common-Gear clearance negative compensation	0	11
V1 axis-Common-Electrical origin position	0	
V1 axis-Common-signal terminal switch state setting	normally on	Ш
V1 axis-Common-signal terminal switch state setting	normally on	Ш
V1 axis-Common-signal terminal switch state setting	normally on	11
V1 axis-Common-signal terminal switch state setting	normally on	Ш
V1 axis-Common-Far-point signal terminal setting	X no terminal	11
V1 axis-Common-Z phase terminal setting	X no terminal	11
¥1 axis-Common-positive limit terminal setting	X no terminal	1
V1 axis-Common-negative limit terminal setting	X no terminal	

PLC1 - Pulse Set

PLCT - Puise Set			
Config 👻 Delete 🛛 init axis 🔷 config guide			
Param SFD1054(dword)	Value	^	
Y1 axis-Common-negative limit terminal setting	X no terminal		
Y1 axis-Common-Zero clear CLR output setting	Y no terminal		
Y1 axis-Common-Return speed VH	0	1.1	
Y1 axis-Common-Creeping speed VC	0		
Y1 axis-Common-Mechanical zero position	0		
Y1 axis-Common-Z phase num	0		
Y1 axis-Common-CLR signal delayed time (ms)	20		
Y1 axis-Common-grinding wheel radius(polar Interpola	0		
Y1 axis-Common-soft limit positive value	0		
Y1 axis-Common-soft limit negative value	0		
Y1 axis=Common=encoder pulse number/1 rotate(closed=	1	~	
Read From PLC Write To PLC OK	Cancel		

Config 👻 Delete 🛛 init axis 🔷 config guide			
Param SFD1093	Value		
Y1 axis-group 1-Pulse default speed	1000		
V1 axis-group 1-Acceleration time of Pulse default s	30		
V1 axis-group 1-Deceleration time of pulse default s	30		
V1 axis-group 1-Acceleration and deceleration time (ms)	10		
¥1 axis−group 1−pulse acc/dec mode	linear acc/dec		
Y1 axis-group 1-Max speed	5000		
V1 axis-group 1-Initial speed	0		
Y1 axis-group 1-stop speed	0		
V1 axis-group 1-FOLLOW performance param(1-100)	50		
Y1 axis-group 1-FOLLOW forward compensation(0-100) 0			
V1 axis-group 1-Pulse frequency refresh time	1 ms refresh		

2-4-2. Quick positioning (polar coordinates) [DRVR]

1. Instruction overview

Quick positioning (polar coordinates) instructions. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Quick positioning [DRVR]				
16-bit	-	32-bit	DRVR	
instruction		instruction		
Execute	Rise/fall edge of the coil	Suitable	XDM, XDME, XLME, XDH	
condition		model		
Firmware	V3.3 and above	Software	V3.3 and above	

2. Operand

Operand	Function	Туре
S0	Axis X target position	Double words, 32-bit
S1	Axis Y target position	Double words, 32-bit
D0	Pulse output port of axis X	Bit
D1	Pulse output port of axis Y	Bit

3. suitable soft component

Word	Operand					Syst	em				Constant	Mod	lule
		D^*	FD	TĽ)*	CD*	DX	DY	DM*	DS^*	K/H	ID	QD
Bit	S0	•	•	•		•							
	S1	•	•	•		•							
	Operand				Sys	stem							
		Х	Y	M*	S*	T*	C*	Dnn	ı				
	D0		٠										
	D1		•										

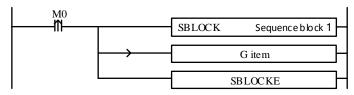
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4.	Parameter	setting
----	-----------	---------

Related parameters	Setting	Note
Final position	Free to specify register address	Must set
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	Set in axis 1 system parameters	Must set
Default speed	Set in axis 1 group 1 parameters	Must set
Acceleration time	Set in axis 1 group 1 parameters	No need to set
Deceleration time	Set in axis 1 group 1 parameters	No need to set

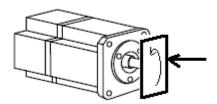
Function and action

«instruction format»



Fast positioning (polar coordinates) instruction refers to the rotation axis of one axis, which rotates the workpiece on the rotating axis, and the forward and backward feed axis which is perpendicular

to the rotating axis. When the rotating axis drives the workpiece to rotate, the feed axis processes the trajectory of the rotating workpiece through forward and backward processing. The trajectory of motion can include straight line and arc, and can be used in processing and grinding equipment.



Double click G item, it will pop up DRVR fast position(polar) instruction configuration panel, as shown below:

	G Instructio	on	×						
Skip	Comment: fast posit	ion(polar)							
DRVR fast posit	DRVR fast position(polar)								
	Params	Register	Absolute						
S0	final position	DO	Absolute						
S1	final position	D10	Absolute						
► D0	axis 1	YO	params						
D1	axis 2	¥1	params						
		ОК	Cancel						

2-4-3. Linear interpolation [LIN]

There are three modes of linear interpolation, the following will introduce one by one.

Mode 1: LIN line

1. Instruction overview

Linear interpolation instruction, operate according to the set default speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Linear interp	Linear interpolation [LIN]						
16-bit	-	32-bit	LIN				
instruction		instruction					
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH				
condition		model					
Firmware	V3.3 and above	Software	V3.3 and above				

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S 1	Axis 2 target position	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand		System								Constant	Mod	lule
		D^*	FD	TL)*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
Bit	Operand				Sys	stem							
		Х	Y	M^*	S^*	T*	C *	Dnm	ı				
	D0		٠										
	D1		•										

* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

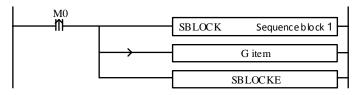
4. Parameter setting

Related parameters	Setting	Note
Final position	Free to specify register address	Must set
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Pulse output port of	Arbitrary specify pulse output point	Must set

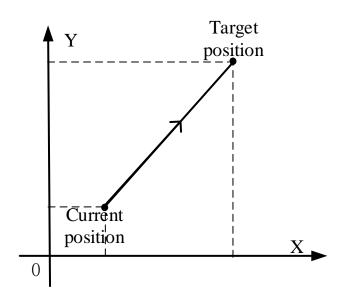
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	Set in axis 1 system parameters	Must set
Default speed	The synthetic speed of two axes, set in axis 1 group 2	Must set
	parameters	
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the LIN instruction of linear interpolation (mode 1) is executed, the two axes will move rapidly from the current position to the target position at the highest synthetic speed of the two axes (the default speed set in axis 1 group 2 parameters). As shown in the following figure:



LIN linear interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

		G Instructio	n		х
Skip		Comment: line			~
		Params	Register	Absolute	
	S0	final position	DO	Absolute	
	S1	final position	D10	Absolute	
•	DO	axis 1	YO	params	
	D1	axis 2	¥1	params	
			ОК	Cancel	

Instruction configuration

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position	Mode
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
YO axis-Common-pulse send mode	complete	mode
YO axis-Common-Pulse num (1)	1	
YO axis-Common-1um(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	~
Read From PLC Write To PLC OK		Cancel

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔹 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set			×
Config 👻 Delete init axis config guide			
Param SFD1036	Value		^
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	logic	
¥1 axis-Common-Parameters setting-enable soft limit	disable		
V1 axis-Common-Parameters setting-mechanical back to	negative		
¥1 axis-Common-Parameters setting Motor operating mo	Position	Mode	
V1 axis-Common-Parameters setting-Pulse unit	1 um		
¥1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	
¥1 axis-Common-pulse send mode	complete	mode	
V1 axis-Common-Pulse num (1)	1		
¥1 axis-Common-1um(revolve)	1		
V1 axis-Common-Pulse direction terminal	¥5		
¥1 axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3

for other optional ports.

- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 500, HSD6 = 1000, D0 = 5000, D10 = 2000, when M0 rises, execute LIN command and move to the target position at the default speed of 1000Hz:
- (1) If the final position is absolute mode, the target position is (5000,2000);
- (2) When the final position is in the relative mode, the target position is (5500,3000).
- When the LIN instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 2: LIN line VM

1. Instruction overview

Linear interpolation instruction, operate according to the set maximum synthetic speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Linear interp	polation [LIN]		
16-bit	-	32-bit	LIN
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	maximum synthetic speed of axis 1 and 2	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

/ord	Operand					Syst	em				Constant	Mod	lule
		D^*	FD	TI)*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	L	•	•	•									
Bit	S2 Operand	•	•	•	Sy	stem							
Bit	L	• X	• Y	• M*	Sy S*		C*	Dnm	1				
Bit	L			-		stem	C*	Dnm	1				

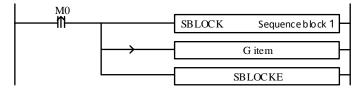
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

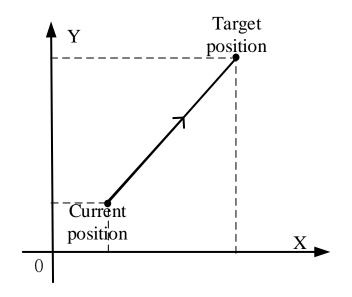
Related parameters	Setting	Note
Final position	Free to specify register address	Must set
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Max speed	Specify the maximum smooth running speed of the	Must set
	two-axis combination, and specify any address.	
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the LIN instruction of linear interpolation (mode 2) is executed, the two axes will move rapidly from the current position to the target position at the set max synthetic speed. As shown in the following figure:



LIN linear interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

S1 final position D10 Absolute	Params Register Absolute SO final position DO Absolute S1 final position D10 Absolute	Skip	Comment: line VM		
SOfinal positionDOAbsoluteS1final positionD10Absolute	S0final positionD0AbsoluteS1final positionD10AbsoluteS2max speedD20D0axis 1Y0params	IN line VM			~
S1 final position D10 Absolute	S1 final position D10 Absolute S2 max speed D20 D0 axis 1 Y0 params		Params	Register	Absolute
	S1 D20 S2 max speed D20 D0 axis 1 Y0 params	S0	final position	DO	Absolute
S2 max speed D20	DO axis 1 YO params	S1	final position	D10	Absolute
		S2	max speed	D20	
► DO axis 1 YO params	D1 axis 2 Y1 params	► DO	axis 1	YO	params
D1 axis 2 Y1 params		D1	axis 2	¥1	params

Instruction configuration

Param SFD906	Value	
0 axis-Common-Parameters setting-Pulse direction logic	positive	logic
0 axis-Common-Parameters setting-enable soft limit	disable	
0 axis-Common-Parameters setting-mechanical back to	negative	
O axis-Common-Parameters setting Motor operating mo	Position	Mode
0 axis-Common-Parameters setting-Pulse unit	1 um	
0 axis-Common-Parameters setting-Interpolation coor	Cross cod	ordi
0 axis-Common-pulse send mode	complete	mode
0 axis-Common-Pulse num (1)	1	
(O axis-Common-lum(revolve)	1	
10 axis-Common-Pulse direction terminal	¥4	
10 axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔹 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set		
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	1
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	logic
Y1 axis-Common-Parameters setting-enable soft limit	disable	
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting-Motor operating mo	Position	Mode
V1 axis-Common-Parameters setting-Pulse unit	1 um	
Y1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
Y1 axis-Common-pulse send mode	complete	mode
Y1 axis-Common-Pulse num (1)	1	
Y1 axis=Common=1um(revolve)	1	
Y1 axis-Common-Pulse direction terminal	¥5	
Y1 axis-Common-Delayed time of pulse direction (ms)	10	
Read From PLC Write To PLC OK		Cancel

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the max speed.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3

for other optional ports.

- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 500, HSD6 = 1000, D0 = 5000, D10 = 2000, D20 = 2000, when M0 rises, execute LIN command and move to the target position at the speed of 2000Hz:
- (1) If the final position is absolute mode, the target position is (5000,2000);
- (2) When the final position is in the relative mode, the target position is (5500,3000).
- When the LIN instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 3: LIN line VBEM

1. Instruction overview

Linear interpolation instruction, operate according to the set maximum synthetic speed, start speed and stop speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Linear interp	polation [LIN]		
16-bit	-	32-bit	LIN
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре			
S0	Axis 1 target position	Double words, 32-bit			
S1	Axis 2 target position	Double words, 32-bit			
S2	Start speed of axis 1 and 2	Double words, 32-bit			
S3	Stop speed of axis 1 and 2	Double words, 32-bit			
S4	maximum synthetic speed of axis 1 and 2	Double words, 32-bit			
D0	Pulse output port of axis 1	Bit			
D1	Pulse output port of axis 2	Bit			

3. Suitable soft component

Word	Operand		System Constant M									Mod	lule	
		D^*	FD	TI)*	CD^*	DX	DY	DM*	DS^*	K/H	ID	QD	
	S0	•	•	•		•								
	S1	•	•	•		•								
	S2	•	•	•		•								
	S3	•	•	•		•								
	S4	•	•	•		•								
		1												
Bit	Operand	System												
Dit		Х	Y	M^*	S^*	T*	C *	Dnm	n					
	D0		•											
	D1		٠											
	•				•	•	•	•						

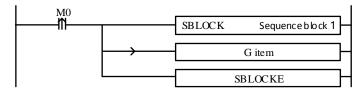
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

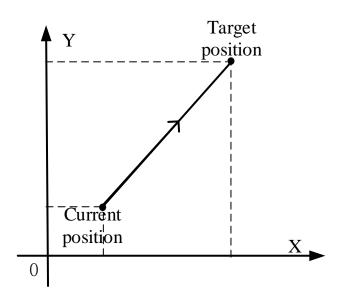
Related parameters	Setting	Note
Final position	Free to specify register address	Must set
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Start speed	Start speed at the starting point of the two axes	Must set
Stop speed	Stop speed at the end point of the two axes	Must set
Max speed	Specify the maximum smooth running speed of the	Must set
	two-axis combination, and specify any address.	
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the LIN instruction of linear interpolation (mode 3) is executed, the two axes will move rapidly from the current position to the target position at the set max synthetic speed, start speed and stop speed. As shown in the following figure:



LIN linear interpolation

The parameter configuration is shown in the following figure:

Double-click G item and pop up the configuration panel. Set it as follows:

Skip		Comment: line	e VBEM		
LIN line	VBEM				~
		Params	Register	Absolute	^
	S0	final position	DO	Absolute	
	S 1	final position	D10	Absolute	
	S2	begin speed	D20		
	S 3	end speed	D30		
	S4	max speed	D40		
•	DO	axis 1	УО	params	
	D1	axis 2	¥1	params	~

Instruction configuration

Param SFD906	Value	
YO axis-Common-Parameters setting-Pulse direction logic	positive logi	c
YO axis-Common-Parameters setting-enable soft limit	disable	
VO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi.	
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-lum(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete init axis config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	15
YO axis-group 2-stop speed	0	Ш
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

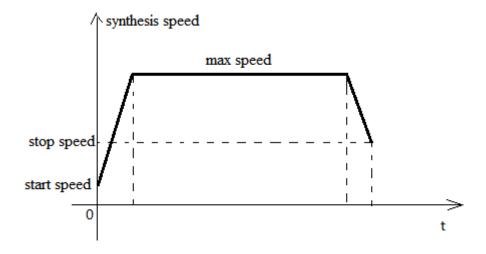
PLC1 - Pulse Set			×
Config 🝷 Delete init axis config guide			
Param SFD1036	Value		^
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
Y1 axis-Common-Parameters setting-enable soft limit	disable		Ľ
Y1 axis-Common-Parameters setting-mechanical back to	negative	2	
¥1 axis-Common-Parameters setting Motor operating mo	Positior	1 Mode	
¥1 axis-Common-Parameters setting-Pulse unit	lum		Ŀ
Y1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
Y1 axis-Common-pulse send mode	complete	e mode	
Y1 axis-Common-Pulse num (1)	1		
V1 axis-Common-1um(revolve)	1		
¥1 axis-Common-Pulse direction terminal	¥5		
Y1 axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the start speed, D30 specifies the stop speed, D40 specifies the max speed.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: 1Hz ~ 100KHz; Acceleration and deceleration time: $0 \sim 65535$ ms.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
 - Assuming HSD2 = 500, HSD6 = 1000, D0 = 5000, D10 = 2000, D20 = 100, D30 = 50, D40 = 2000, when M0 rises, execute LIN command, accelerate from the starting point at 100Hz to 2000 Hz and stop at 50Hz after moving to the target position.
- (1) If the final position is absolute mode, the target position is (5000,2000);
- (2) When the final position is in the relative mode, the target position is (5500,3000).
- When the LIN instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Note: In this mode, the start speed (S2), the stop speed (S3) and the max speed (S4) are all expressed as the two-axis synthesis speed, as shown in the following figure:

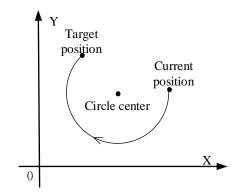


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the stop speed and maximum speed of the previous linear/arc interpolation can be set the same as the start speed and maximum speed of the next segment.

When the third mode is used, the initial and stop speed in the pulse parameter configuration tables of axis 1 and axis 2 are only effective for calculating the slope of pulse acceleration and deceleration.

2-4-4. Clockwise arc [CW]

CW interpolation mainly determines the arc through the current position of the arc, the target position and the coordinates of the center of the circle, as shown in the following figure:



From the above figure, we can see that when we need to draw a whole circle, we only need to set the target position to the current position. CW has three modes. The usage of CW is described below.

Mode 1: CW clockwise	
----------------------	--

1. Instruction overview

Clockwise arc interpolation instruction, operate according to the set default speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Clockwise arc interpolation [CW]								
16-bit	-	32-bit	CW					
instruction		instruction						
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH					
condition		model						
Firmware	V3.3 and above	Software	V3.3 and above					

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the center position of axis 1 (always	Double words, 32-bit
	relative to the starting coordinates)	
S3	Specify the center position of axis 2 (always	Double words, 32-bit
	relative to the starting coordinates)	
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand	System									Constant	Mod	lule
		D^*	FD	TI) *	CD*	DX	DY	DM*	DS^*	K/H	ID	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	٠	•		•							
Bit	Operand												
	operand	X	Y	M*	S*	stem T*	C*	Dn.n	n				
	D0		•										
	D1		•			1							

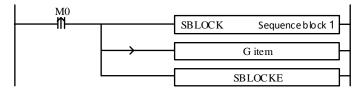
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter	setting
--------------	---------

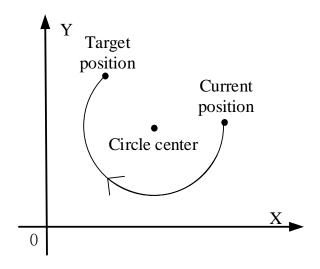
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Circle center	The position of the center is determined by the	Must set
position	position of the starting point and the end point	
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	Must set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the CW instruction of arc interpolation (mode 1) is executed, the two axes will run at the highest synthesis speed. As shown in the following figure:



CW clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

Skip	Comment: clocky	wise	
CW clockwis	9		Ý
	Params	Register	Absolute
SC) final position	DO	Absolute
S1	final position	D10	Absolute
S2	center position	D20	Relative
Sa	center position	D30	Relative
► DO	axis 1	УО	params
D1	!- 0	¥1	params

Instruction configuration

Config 👻 Delete init axis config guide		
Param SFD906	Value	· · · · · · · · · · · · · · · · · · ·
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position	Mode
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross cod	ordi
YO axis-Common-pulse send mode	complete	mode
YO axis-Common-Pulse num (1)	1	
YO axis-Common-lum(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔹 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set			×
Config 👻 Delete 🛛 init axis 🔷 config guide			
Param SFD1036	Value		^
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
V1 axis-Common-Parameters setting-enable soft limit	disable		Ľ
V1 axis-Common-Parameters setting-mechanical back to	negative	2	
V1 axis-Common-Parameters setting-Motor operating mo	Position	1 Mode	
V1 axis-Common-Parameters setting-Pulse unit	1 um		L
Y1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
V1 axis-Common-pulse send mode	complete	e mode	
Y1 axis-Common-Pulse num (1)	1		
V1 axis=Common=1um(revolve)	1		
V1 axis-Common-Pulse direction terminal	¥5		
V1 axis-Common-Delayed time of pulse direction (ms)	10		
Read From PLC Write To PLC OK		Cancel	

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle center of axis 1, D30 specifies the circle center of axis 2.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, when M0 rises, execute CW command, move from the starting position (1000, 1000) to the target position at the default speed of 1000Hz.

(1) When the end point is in absolute mode, the target position is (5000,2000), the center position is (3000,1500), and D20 = 2000, D30 = 500.

(2) When the end point is in the relative mode, the target position is (6000,3000), the center position is (3500,2000), and D20 = 2500, D30 = 1000.

- When the CW instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 2: CW clockwise VM

1. Instruction overview

Clockwise arc interpolation instruction, operate according to the set maximum synthetic speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Clockwise a	rc interpolation [CW]		
16-bit	-	32-bit	CW
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the center position of axis 1 (always relative to the starting coordinates)	Double words, 32-bit
S3	Specify the center position of axis 2 (always relative to the starting coordinates)	Double words, 32-bit
S4	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Waad	Operand		System				Constant	Moc	lule				
Word		D^*	FD	TL)*	CD^*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
	S4	•	•	•		•							
Bit	Operand		System										
		Х	Y	M*	S^*	T*	C*	Dnm	L				
	D0		•										
	D1		•										

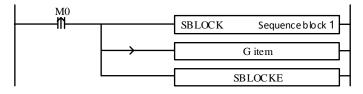
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

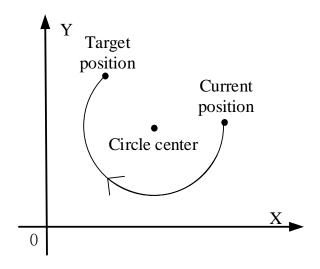
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Circle center	The position of the center is determined by the	Must set
position	position of the starting point and the end point	
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the CW instruction of arc interpolation (mode 2) is executed, the two axes will run at the set max synthesis speed. As shown in the following figure:



CW clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

Skip		Comment: clo	ckwise VM		
W clock	kwise \	/M			~
		Params	Register	Absolute	^
	S0	final position	DO	Absolute	
	S1	final position	D10	Absolute	
	S2	center position	D20	Relative	
	S 3	center position	D30	Relative	
	S4	max speed	D40		
•	DO	axis 1	ΥО	params	
	D1	axis 2	¥1	params	~

Instruction configuration

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting Motor operating mo	Position	Mode
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross coo	ordi
YO axis-Common-pulse send mode	complete	mode
YO axis-Common-Pulse num (1)	1	
YO axis-Common-1um(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	~
Read From PLC Write To PLC OK	(Cancel

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔹 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set			×		
Config 🝷 Delete init axis config guide					
Param SFD1036	Value		^		
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	logic			
¥1 axis-Common-Parameters setting-enable soft limit	disable		Ľ		
Y1 axis-Common-Parameters setting-mechanical back to	negative	2			
Y1 axis-Common-Parameters setting Motor operating mo Position Mode					
¥1 axis-Common-Parameters setting-Pulse unit	lum		L		
¥1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi			
Y1 axis-Common-pulse send mode	complete	e mode			
Y1 axis-Common-Pulse num (1)	1				
V1 axis-Common-1um(revolve)	1				
V1 axis-Common-Pulse direction terminal	¥5				
Y1 axis-Common-Delayed time of pulse direction (ms)	10		~		
Read From PLC Write To PLC OK		Cancel			

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle center of axis 1, D30 specifies the circle center of axis 2, D40 specifies the max speed.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 500Hz, when M0 rises, execute CW command, move from the starting position (1000, 1000) to the target position at the max speed of 500Hz.

(1) When the end point is in absolute mode, the target position is (5000,2000), the center position is (3000,1500), and D20 = 2000, D30 = 500.

(2) When the end point is in the relative mode, the target position is (6000,3000), the center position is (3500,2000), and D20 = 2500, D30 = 1000.

- When the CW instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 3: CW clockwise VBEM

1. Instruction overview

Clockwise arc interpolation instruction, operate according to the set maximum synthetic speed, start speed and stop speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Clockwise arc interpolation [CW]					
16-bit	-	32-bit	CW		
instruction		instruction			
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH		
condition		model			
Firmware	V3.3 and above	Software	V3.3 and above		

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the center position of axis 1 (always relative to the starting coordinates)	Double words, 32-bit
S3	Specify the center position of axis 2 (always relative to the starting coordinates)	Double words, 32-bit
S4	Specify the starting speed at the starting point of the two axes	Double words, 32-bit

S5	Specify the stop speed at the end point of the two	Double words, 32-bit
	axes	
S6	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Vord	Operand	System									Constant	Mod	Module	
vora		D^*	FD	П) *	CD^*	DX	DY	DM*	DS^*	K/H	ID	QD	
	S0~S6	•	•	•		•								
Bit	Operand	System												
		Х	Y	M^*	S^*	T*	C*	Dn.m	ı					
	D0		•											
	-													

* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

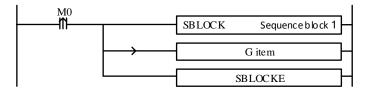
Related parameters	Setting	Note			
Final position	Determine the end point position according to	Must set			
	relative/absolute mode				
Relative/absolute	Relative: the above position as a reference; absolute:	Must set			
	the origin as a reference				
Circle center	The position of the center is determined by the	Must set			
position	position of the starting point and the end point				
Max speed	Specify maximum smooth running speed of two axes	Must set			
Start speed	The start speed from the starting point	Must set			
Stop speed	Stop speed The stop speed at the end point				
Pulse output port of	Must set				
axis 1					
Pulse output port of	Arbitrary specify pulse output point	Must set			
axis 2					
Direction port of	Arbitrarily specify idle output points, set in system	Must set			
axis 1	parameters				
Direction port of	Arbitrarily specify idle output points, set in system	Must set			
axis 2	parameters				
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set			
	axis 1 system parameters				
Default speed	set in axis 1 group 2 parameters	No need to set			
Acceleration time	Set in axis 1 group 2 parameters	No need to set			

4. Parameter setting

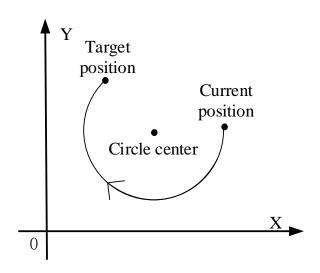
Deceleration time Set in axis 1 group 2 parameters	No need to set
--	----------------

Function and action

《Instruction format》



When the CW instruction of arc interpolation (mode 3) is executed, the two axes will run at the set max synthesis speed, start speed and stop speed. As shown in the following figure:



CW clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

	G Instru	iction		h
Skip	Comment: cloc	kwise VBEM		
CW clockwi	se VBEM			~
	Params	Register	Absolute	^
S) final position	DO	Absolute	
S	1 final position	D10	Absolute	
S	2 center position	D20	Relative	
S		D30	Relative	
S	1 ' 1	D40		
S	1 1	D50		
S	- 1	D60		~
0	0	OK	Cance	

	G Instruc	tion		×
Skip	Comment: clock	wise VBEM		
CW cloc	kwise VBEM			~
	Params	Register	Absolute	^
	center position	D30	Relative	
	begin speed	D40		
	end speed	D50		
	max speed	D60		
•	DO axis 1	YO	params	
	D1 axis 2	¥1	params	
			·	¥
		ОК	Cance	

Instruction configuration

PLC1 - Pulse Set			-
Config - Delete init axis config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		Ľ
YO axis-Common-Parameters setting-mechanical back to	negative		L
YO axis-Common-Parameters setting Motor operating mo	Position	Mode	L
YO axis-Common-Parameters setting-Pulse unit	1um		L
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	L
YO axis-Common-pulse send mode	complete	mode	L
YO axis-Common-Pulse num (1)	1		L
YO axis-Common-1um(revolve)	1		L
YO axis-Common-Pulse direction terminal	¥4		L
YO axis-Common-Delayed time of pulse direction (ms)	10		.
Read From PLC Write To PLC OK		Cancel	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	~
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

Config 👻 Delete 🛛 init axis 🖉 config guide			
Param SFD1036	Value		1
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	logic	
V1 axis-Common-Parameters setting-enable soft limit	disable		
V1 axis-Common-Parameters setting-mechanical back to	negative		
V1 axis-Common-Parameters setting-Motor operating mo	Position	Mode	
Y1 axis-Common-Parameters setting-Pulse unit	1 um		
V1 axis-Common-Parameters setting-Interpolation coor	Cross coo	rdi	
Y1 axis-Common-pulse send mode	complete	mode	
Y1 axis-Common-Pulse num (1)	1		
¥1 axis-Common-1um(revolve)	1		
¥1 axis-Common-Pulse direction terminal	¥5		
Y1 axis-Common-Delayed time of pulse direction (ms)	10		

Axis Y1 system parameters

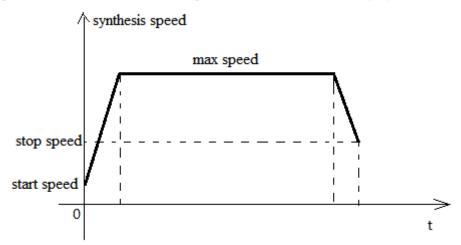
- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle center of axis 1, D30 specifies the circle center of axis 2, D40 specifies the start speed, D50 specifies the stop speed, D60 specifies the max speed.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 50Hz, D50 = 20, D60 = 2000, when M0 rises, execute CW command, accelerate from the starting position (1000,1000) at speed 50Hz to the maximum speed (2000Hz), and stop at the end speed of 20Hz when moving to the target position.

(1) When the end point is in absolute mode, the target position is (5000,2000), the center position is (3000,1500), and D20 = 2000, D30 = 500.

(2) When the end point is in the relative mode, the target position is (6000,3000), the center position is (3500,2000), and D20 = 2500, D30 = 1000.

- When the CW instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Note: In this mode, the starting speed (S4), the ending speed (S5) and the maximum speed (S6) are all expressed as the two-axis synthesis speed, as shown in the following figure:

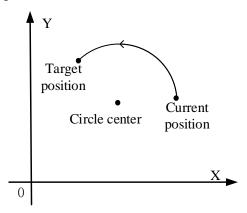


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

When mode 3 is used, the starting and ending speed in the pulse parameter configuration tables of axis 1 and axis 2 are only effective for calculating the slope of pulse acceleration and deceleration.

2-4-5. Anticlockwise arc [CCW]

Anticlockwise arc interpolation CCW determines a section of arc mainly through the current position of arc, the target position and the counterclockwise coordinates of the center of the circle, as shown in the following figure:



With the above image, when you need to draw an entire circle, just set the target position to the current position. There are three modes of anticlockwise arc interpolation CCW, the usage of which is described below.

Mode 1: CCW anticlockwise arc

1. Instruction overview

Anticlockwise arc interpolation instruction, operate according to the set default speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Anticlockwi	Anticlockwise arc interpolation [CCW]					
16-bit	-	32-bit	CCW			
instruction		instruction				
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH			
condition		model				
Firmware	V3.3 and above	Software	V3.3 and above			

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S 1	Axis 2 target position	Double words, 32-bit
S2	Specify the center position of axis 1 (always relative to the starting coordinates)	Double words, 32-bit
S3	Specify the center position of axis 2 (always relative to the starting coordinates)	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand					Syst	em				Constant	Mod	lule
		D^*	FD	ΤΙ)*	CD^*	DX	DY	DM*	DS^*	K/H	ID	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
D:4	Operand				Sys	tem							
Bit		Х	Y	M^*	S^*	Τ*	C*	Dnm	ı				
	D0		•										
	D1		•										

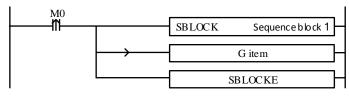
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note
Final position	Determine the end point position according to relative/absolute mode	Must set
Relative/absolute	Relative: the above position as a reference; absolute: the origin as a reference	Must set
Circle center position	The position of the center is determined by the position of the starting point and the end point	Must set
Pulse output port of axis 1	Arbitrary specify pulse output point	Must set
Pulse output port of axis 2	Arbitrary specify pulse output point	Must set
Direction port of axis 1	Arbitrarily specify idle output points, set in system parameters	Must set
Direction port of axis 2	Arbitrarily specify idle output points, set in system parameters	Must set
Pulse unit	The pulse number or equivalent are acceptable. Set in axis 1 system parameters	Must set
Default speed	set in axis 1 group 2 parameters	Must set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

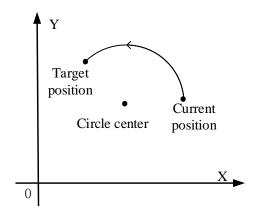
4. Parameter setting

Function and action

《Instruction format》



When the CCW instruction of arc interpolation (mode 1) is executed, the two axes will run at the highest synthesis speed. As shown in the following figure:



CCW clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

	G Instructio	on	×
Skip	Comment: anticlock	wise	
CCW anticlockw	ise		~
	Params	Register	Absolute
S0	final position	DO	Absolute
S1	final position	D10	Absolute
S2	center position	D20	Relative
S3	center position	D30	Relative
► D0	axis 1	УО	params
D1	axis 2	¥1	params
		ОК	Cancel

Instruction configuration

PLC1 - Pulse Set			-
Config - Delete init axis config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		Ľ
YO axis-Common-Parameters setting-mechanical back to	negative		L
YO axis-Common-Parameters setting Motor operating mo	Position	Mode	L
YO axis-Common-Parameters setting-Pulse unit	1um		L
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	L
YO axis-Common-pulse send mode	complete	mode	L
YO axis-Common-Pulse num (1)	1		L
YO axis-Common-1um(revolve)	1		L
YO axis-Common-Pulse direction terminal	¥4		L
YO axis-Common-Delayed time of pulse direction (ms)	10		.
Read From PLC Write To PLC OK		Cancel	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	~
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

Config - Delete init axis config guide		
Param SFD1036	Value	
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	logic
V1 axis-Common-Parameters setting-enable soft limit	disable	
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting-Motor operating mo	Position	Mode
V1 axis-Common-Parameters setting-Pulse unit	1um	
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
V1 axis-Common-pulse send mode	complete	mode
Y1 axis-Common-Pulse num (1)	1	
Y1 axis=Common=1um(revolve)	1	
V1 axis-Common-Pulse direction terminal	¥5	
Y1 axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle center of axis 1, D30 specifies the circle center of axis 2.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, when M0 rises, execute CCW command, move from the starting position (1000, 1000) to the target position at the default speed of 1000Hz.
- (1) When the end point is in absolute mode, the target position is (5000,2000), the center position is (3000,1500), and D20 = 2000, D30 = 500.
- (2) When the end point is in the relative mode, the target position is (6000,3000), the center position is (3500,2000), and D20 = 2500, D30 = 1000.
- When the CCW instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 2: CCW anticlockwise VM

1. Instruction overview

Anticlockwise arc interpolation instruction, operate according to the set maximum synthetic speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Anticlockwi	se arc interpolation [CCW]		
16-bit	-	32-bit	CCW
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the center position of axis 1 (always relative to the starting coordinates)	Double words, 32-bit
83	Specify the center position of axis 2 (always relative to the starting coordinates)	Double words, 32-bit
S4	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand		System									Module	
		D^*	FD	TI)*	CD*	DX	DY	DM*	DS^*	K/H	ID	QD
	S0	٠	•	•		•							
	S1	٠	•	•		•							
	S2	٠	•	•		•							
	S3	٠	•	•		•							
	S4	٠	•	•		•							
Bit	Operand	Operand System											
		Х	Y	M^*	S^*	T*	C*	Dnm	L				
	D0		•										
	D1		•										

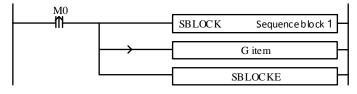
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Circle center	The position of the center is determined by the	Must set
position	position of the starting point and the end point	
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

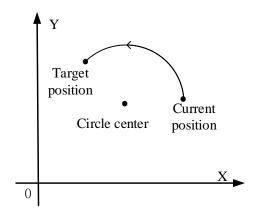
4. Parameter setting

Function and action

《Instruction format》



When the CCW instruction of arc interpolation (mode 2) is executed, the two axes will run at the set max synthesis speed. As shown in the following figure:



CCW clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

	G Instru	ction		×
Skip	Comment: antic	lockwise VM		
CCW anticlockw	ise VM			~
	Params	Register	Absolute	^
S0	final position	DO	Absolute	
S1	final position	D10	Absolute	
S2	center position	D20	Relative	
S3	center position	D30	Relative	
S4	max speed	D40		
► DO	axis 1	ΥΟ	params	
D1	axis 2	¥1	params	~
		ОК	Cance	I

Instruction configuration

Config 🗸 Delete 🛛 init axis 🔹 config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		Ľ
YO axis-Common-Parameters setting-mechanical back to	negative		
YO axis-Common-Parameters setting-Motor operating mo	Position	Mode	
YO axis-Common-Parameters setting-Pulse unit	1 นก		
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	
YO axis-Common-pulse send mode	complete	mode	
YO axis-Common-Pulse num (1)	1		
YO axis-Common-1um(revolve)	1		
YO axis-Common-Pulse direction terminal	¥4		
YO axis-Common-Delayed time of pulse direction (ms)	10		~
YO axis-Common-lum(revolve) YO axis-Common-Pulse direction terminal	1 ¥4		

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	~
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	^
V1 axis-Common-Parameters setting-Pulse direction logic	positive log	ic
¥1 axis-Common-Parameters setting-enable soft limit	disable	- 11
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting Motor operating mo	Position Mod	le
Y1 axis-Common-Parameters setting-Pulse unit	1 um	
Y1 axis-Common-Parameters setting-Interpolation coor	Cross coordi	
Y1 axis-Common-pulse send mode	complete mod	le
Y1 axis-Common-Pulse num (1)	1	
Y1 axis=Common=1um(revolve)	1	
Y1 axis-Common-Pulse direction terminal	¥5	
V1 axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle center of axis 1, D30 specifies the circle center of axis 2, D40 specifies the max speed.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 500Hz, when M0 rises, execute CCW command, move from the starting position (1000, 1000) to the target position at the max speed of 500Hz.

(1) When the end point is in absolute mode, the target position is (5000,2000), the center position is (3000,1500), and D20 = 2000, D30 = 500.

(2) When the end point is in the relative mode, the target position is (6000,3000), the center position is (3500,2000), and D20 = 2500, D30 = 1000.

- When the CCW instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 3: CCW anticlockwise VBEM

1. Instruction overview

Anticlockwise arc interpolation instruction, operate according to the set maximum synthetic speed, start speed and stop speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Anticlockwi	se arc interpolation [CCW]		
16-bit	-	32-bit	CCW
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the center position of axis 1 (always relative to the starting coordinates)	Double words, 32-bit
S3	Specify the center position of axis 2 (always relative to the starting coordinates)	Double words, 32-bit
S4	Specify the starting speed at the starting point of the two axes	Double words, 32-bit
S5	Specify the stop speed at the end point of the two axes	Double words, 32-bit
S6	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Vord	Operand		System									Module	
Word		D^*	FD	TL)*	CD*	DX	DY	DM*	DS^*	K/H	ID	QD
	S0~S6	٠	•	•		•							
Bit	Operand				Sys	stem							
		Х	Y	M^*	S^*	T*	C*	Dnm	ı				
	D0		•										
	D1		•										

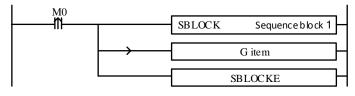
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note
Final position	Determine the end point position according to relative/absolute mode	Must set
Relative/absolute	Relative: the above position as a reference; absolute: the origin as a reference	Must set
Circle center position	The position of the center is determined by the position of the starting point and the end point	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Start speed	The start speed from the starting point	Must set
Stop speed	The stop speed at the end point	Must set
Pulse output port of axis 1	Arbitrary specify pulse output point	Must set
Pulse output port of axis 2	Arbitrary specify pulse output point	Must set
Direction port of axis 1	Arbitrarily specify idle output points, set in system parameters	Must set
Direction port of axis 2	Arbitrarily specify idle output points, set in system parameters	Must set
Pulse unit	The pulse number or equivalent are acceptable. Set in axis 1 system parameters	Must set
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

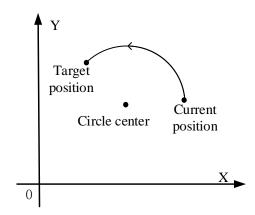
4. Parameter setting

Function and action

《Instruction format》



When the CCW instruction of arc interpolation (mode 3) is executed, the two axes will run at the set max synthesis speed, start speed and stop speed. As shown in the following figure:



CCW clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

		G Inst	truction		×
Skip CCW ant	iclocky	Comment: a	nticlockwise VBEM		~
		Params	Register	Absolute	^
	S0	final position	DO	Absolute	
	S1	final position	D10	Absolute	
	S2	center position	D20	Relative	
	S 3	center position	D30	Relative	
	S4	begin speed	D40		
	S5	end speed	D50		
	<u>S6</u>	max speed	D60		~
	50		ОК	Cance	

Skip	Comment: anti	clockwise VBEM		
CCW anticl	ockwise VBEM			~
	Params	Register	Absolute	^
	center position	D30	Relative	
	begin speed	D40		
	end speed	D50		
	max speed	D60		
<u>۲</u>)0 axis 1	УО	params	
Γ)1 axis 2	¥1	params	
			1	~

Instruction configuration

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive la	gic
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting Motor operating mo	Position Mo	de
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross coord	li
YO axis-Common-pulse send mode	complete mo	de
YO axis-Common-Pulse num (1)	1	
YO axis-Common-1um(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	~
Read From PLC Write To PLC OK	Ca	ncel

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔹 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set		
Config - Delete init axis config guide		
Param SFD1036	Value	1
V1 axis-Common-Parameters setting-Pulse direction logic	positive	logic
Y1 axis-Common-Parameters setting-enable soft limit	disable	
Y1 axis-Common-Parameters setting-mechanical back to	negative	
Y1 axis-Common-Parameters setting-Motor operating mo	Position	Mode
Y1 axis-Common-Parameters setting-Pulse unit	lum	
Y1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
Y1 axis-Common-pulse send mode	complete	mode
Y1 axis-Common-Pulse num (1)	1	
Y1 axis=Common=1um(revolve)	1	
Y1 axis-Common-Pulse direction terminal	¥5	
Y1 axis-Common-Delayed time of pulse direction (ms)	10	
Read From PLC Write To PLC OK		Cancel

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle center of axis 1, D30 specifies the circle center of axis 2, D40 specifies the start speed, D50 specifies the stop speed, D60 specifies the max

speed.

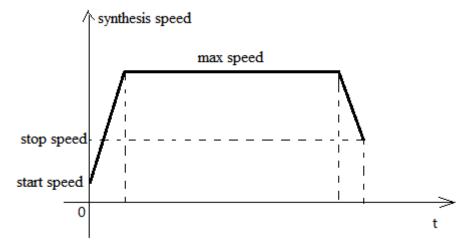
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: 1Hz ~ 100KHz; Acceleration and deceleration time: $0 \sim 65535$ ms.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 50Hz, D50 = 20, D60 = 2000, when M0 rises, execute CCW command, accelerate from the starting position (1000,1000) at speed 50Hz to the maximum speed (2000Hz), and stop at the end speed of 20Hz when moving to the target position.

(1) When the end point is in absolute mode, the target position is (5000,2000), the center position is (3000,1500), and D20 = 2000, D30 = 500.

(2) When the end point is in the relative mode, the target position is (6000,3000), the center position is (3500,2000), and D20 = 2500, D30 = 1000.

- When the CCW instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Note: In this mode, the starting speed (S4), the ending speed (S5) and the maximum speed (S6) are all expressed as the two-axis synthesis speed, as shown in the following figure:

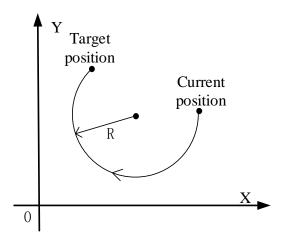


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

When mode 3 is used, the starting and ending speed in the pulse parameter configuration tables of axis 1 and axis 2 are only effective for calculating the slope of pulse acceleration and deceleration.

2-4-6. Clockwise arc [CW_R]

Clockwise arc interpolation CW_R is mainly based on the current position of the arc, the target position and the length of the radius of the circle, clockwise to determine a section of the arc, as shown in the following figure:



With the above figure, when the target position is set at the same position as the current one, the next circle can not be determined, so this mode can not draw a whole circle. There are three modes of CW_R. The usage of CW_R is described below.

Mode 1: CW_R clockwise arc

1. Instruction overview

Clockwise arc interpolation instruction, operate according to the set default speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Clockwise a	rc interpolation [CW_R]		
16-bit	-	32-bit	CW_R
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S 1	Axis 2 target position	Double words, 32-bit
S2	Specify the radius of the arc	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

ord		System							Constant	Mo	lule	
ora		D^*	FD	TD^*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	٠	٠	•	•							
	S1	•	•	•	•							
	S2	•	•	•	•							
	52	•	•	•	•							
Bit	Operand				System		1		<u> </u>			I
Bit		X				C*	Dnn	n	<u> </u>		<u> </u>	
Bit					System	C*	Dnn	n	<u> </u>	<u> </u>	1	

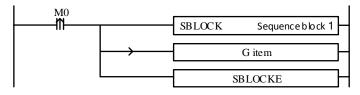
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter se	etting
-----------------	--------

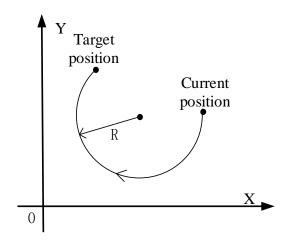
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Radius	The path of an arc varies with its radius.	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	Must set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the CW_R instruction of arc interpolation (mode 1) is executed, the two axes will run at the highest synthesis speed. As shown in the following figure:



CW_R clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

		G Instructio	on	×				
Skip		Comment: clockwis	e					
CW_R clockwise V								
		Params	Register	Absolute				
	S0	final position	DO	Absolute				
	S1	final position	D10	Absolute				
	S2	radius	D20					
•	DO	axis 1	ΥΟ	params				
	D1	axis 2	¥1	params				
			ОК	Cancel				

Instruction configuration

PLC1 - Pulse Set			×
Config 👻 Delete init axis config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		
YO axis-Common-Parameters setting-mechanical back to	negative		
YO axis-Common-Parameters setting-Motor operating mo	Position	Mode	
YO axis-Common-Parameters setting-Pulse unit	1 um		
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	
YO axis-Common-pulse send mode	complete	mode	
YO axis-Common-Pulse num (1)	1		
YO axis-Common-lum(revolve)	1		
YO axis-Common-Pulse direction terminal	¥4		
YO axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel]

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete init axis config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	~
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	^
V1 axis-Common-Parameters setting-Pulse direction logic	positive log	ic
V1 axis-Common-Parameters setting-enable soft limit	disable	- 12
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting Motor operating mo	Position Mod	e
V1 axis-Common-Parameters setting-Pulse unit	1 um	
V1 axis-Common-Parameters setting-Interpolation coor	Cross coordi	
¥1 axis-Common-pulse send mode	complete mod	e
Y1 axis-Common-Pulse num (1)	1	
Y1 axis=Common=1um(revolve)	1	
Y1 axis-Common-Pulse direction terminal	¥5	
Y1 axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle radius. The path of an arc varies with its radius.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, when M0 rises, execute CW_R command, move from the starting position (1000, 1000) to the target position at the default speed of 1000Hz.
- (1) When the end point is in absolute mode, the target position is (5000,2000)

(2) When the end point is in the relative mode, the target position is (6000,3000)

- When the CW_R instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.
- When the radius is positive, the arc is inferior; when the radius is negative, it is major arc.

Mode 2: CW_R clockwise arc VM

1. Instruction overview

Clockwise arc interpolation instruction, operate according to the set maximum synthetic speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Clockwise a	rc interpolation [CW_R]		
16-bit	-	32-bit	CW_R
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	S0 Axis 1 target position Double words, 32-bit	
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the radius of the arc	Double words, 32-bit
S3	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Operand					Syst	tem				Constant	Mod	lule
	D^*	FD	TD	*	CD^*	DX	DY	DM*	DS^*	K/H	D	QD
S0	٠	•	•		•							
S1	٠	•	•		•							
S2	•	•	•		•							
S3	•	•	•		•							
Operand				Sys	stem							
	Х	Y	М*	S^*	T*	C*	Dnm	L				
D0		•										

* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

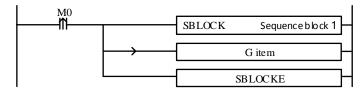
4. Parameter setting

Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	

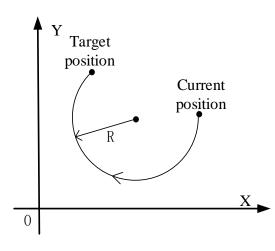
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Radius	The path of an arc varies with its radius.	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the CW_R instruction of arc interpolation (mode 2) is executed, the two axes will run at the set max synthesis speed. As shown in the following figure:



CW_R clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

		G Instruct	tion	×
Skip		Comment: clocky	wise VM	
CW_R	clockwise	• VM		~
		Params	Register	Absolute
	S0	final position	DO	Absolute
	S1	final position	D10	Absolute
	S2	radius	D20	
	S 3	max speed	D30	
•	DO	axis 1	УО	params
	D1	axis 2	¥1	params
			ОК	Cancel

Instruction configuration

PLC1 - Pulse Set			-
Config - Delete init axis config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		Ľ
YO axis-Common-Parameters setting-mechanical back to	negative		L
YO axis-Common-Parameters setting Motor operating mo		Mode	L
YO axis-Common-Parameters setting-Pulse unit	1um		L
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	L
YO axis-Common-pulse send mode		mode	L
YO axis-Common-Pulse num (1) 1			L
YO axis-Common-1um(revolve)	1		L
YO axis-Common-Pulse direction terminal	¥4		L
YO axis-Common-Delayed time of pulse direction (ms)	10		.
Read From PLC Write To PLC OK		Cancel	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	~
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	1
V1 axis-Common-Parameters setting-Pulse direction logic	positive log	çi c
V1 axis-Common-Parameters setting-enable soft limit	disable	- 11
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting-Motor operating mo	Position Mod	le
V1 axis-Common-Parameters setting-Pulse unit	1 นท	
V1 axis-Common-Parameters setting-Interpolation coor	Cross coordi	
Y1 axis-Common-pulse send mode	complete mod	le
Y1 axis-Common-Pulse num (1)	1	
Y1 axis-Common-1um(revolve)	1	
V1 axis-Common-Pulse direction terminal	¥5	
Y1 axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the radius (the radius is different and the path is different), D30 specifies the max speed.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 500Hz, when M0 rises, execute CW_R command, move from the starting position (1000, 1000) to the target position at the max speed of 500Hz.
- (1) When the end point is in absolute mode, the target position is (5000,2000)
- (2) When the end point is in the relative mode, the target position is (6000,3000)
- When the CW_R instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.
- When the radius is positive, the arc is inferior; when the radius is negative, it is major arc.

Mode 3: CW_R clockwise arc VBEM

1. Instruction overview

Clockwise arc interpolation instruction, operate according to the set maximum synthetic speed, start speed and stop speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Clockwise a	rc interpolation [CW_R]		
16-bit	-	32-bit	CW_R
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the radius of the arc	Double words, 32-bit
S3	Specify the starting speed at the starting point of	Double words, 32-bit
	the two axes	
S4	Specify the stop speed at the end point of the two	Double words, 32-bit
	axes	
S5	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand					Syst	em				Constant	Module	
		D^*	FD	TĽ)*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0~S5	•	•	•		•							
it	Operand				Sys	stem							
					~*		~						
		Х	Y	M*	S*	Τ*	C*	Dnm	ı				
	D0	X	Y •	M	S	1*	C	Dnm	1				

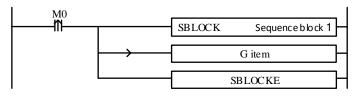
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
radius	The radius is different and the path is different	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Start speed	The start speed from the starting point	Must set
Stop speed	The stop speed at the end point	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

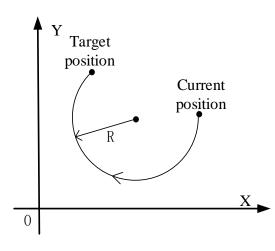
4. Parameter setting

Function and action

《Instruction format》



When the CW_R instruction of arc interpolation (mode 3) is executed, the two axes will run at the set max synthesis speed, start speed and stop speed. As shown in the following figure:



CW_R clockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

	G Instru	ction		×
Skip CW_R clockv		cwise VBEM		~
	Params	Register	Absolute	^
S0	final position	DO	Absolute	
S1	final position	D10	Absolute	
S2	radius	D20		
S3	begin speed	D30		
S4	end speed	D40		
S5	max speed	D50		
•	axis 1	ΥО	params	~
		ОК	Cance	1

Skip	Comment: clo	ckwise VBEM		
CW_Rd	lockwise VBEM			~
	Params	Register	Absolute	^
	radius	D20		
	begin speed	D30		
	end speed	D40		
	max speed	D50		
•	DO axis 1	ΥО	params	
	D1 axis 2	¥1	params	
				v

Instruction configuration

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive log	ic
YO axis-Common-Parameters setting-enable soft limit	disable	- 12
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position Mod	e
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
YO axis-Common-pulse send mode	complete mod	e
YO axis-Common-Pulse num (1)	1	
YO axis=Common=1um(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	
Read From PLC Write To PLC OK	Cano	cel

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

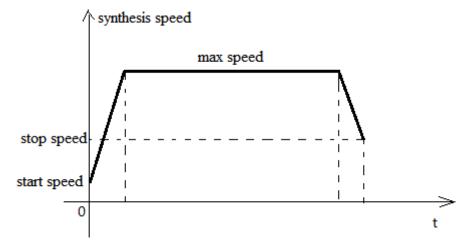
PLC1 - Pulse Set			×
Config 🝷 Delete init axis config guide			
Param SFD1036	Value		^
V1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
¥1 axis-Common-Parameters setting-enable soft limit	disable		Ľ
V1 axis-Common-Parameters setting-mechanical back to	negative	2	
V1 axis-Common-Parameters setting Motor operating mo	Position	1 Mode	
V1 axis-Common-Parameters setting-Pulse unit	1 um		Ŀ
Y1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
¥1 axis-Common-pulse send mode	complete	e mode	
V1 axis-Common-Pulse num (1)	1		
V1 axis-Common-1um(revolve)	1		
V1 axis-Common-Pulse direction terminal	¥5		
Y1 axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the radius, D30 specifies the start speed, D40 specifies the stop speed, D50 specifies the max speed.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 50Hz, D50 = 20, D60 = 2000, when M0 rises, execute CW_R command, accelerate from the starting position (1000,1000) at speed 50Hz to the maximum speed (2000Hz), and stop at the end speed of 20Hz when moving to the target position.
- (1) When the end point is in absolute mode, the target position is (5000,2000)
- (2) When the end point is in the relative mode, the target position is (6000,3000)
- When the CW_R instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.
- When the radius is positive, the arc is inferior; when the radius is negative, it is major arc.

Note: In this mode, the starting speed (S3), the ending speed (S4) and the maximum speed (S5) are all expressed as the two-axis synthesis speed, as shown in the following figure:

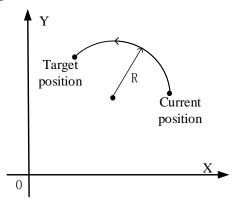


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

When mode 3 is used, the starting and ending speed in the pulse parameter configuration tables of axis 1 and axis 2 are only effective for calculating the slope of pulse acceleration and deceleration.

2-4-7. Anticlockwise arc [CCW_R]

Anticlockwise arc interpolation CCW R is mainly based on the current position of the arc, the target position and the length of the radius of the circle, clockwise to determine a section of the arc, as shown in the following figure:



With the above figure, when the target position is set at the same position as the current one, the next circle can not be determined, so this mode can not draw a whole circle. There are three modes of CCW_R. The usage of CCW_R is described below.

Mode 1: CCW R anticlockwise arc

1. Instruction overview

Anticlockwise arc interpolation instruction, operate according to the set default speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Anticlockwi	se arc interpolation [CCW_R]		
16-bit	-	32-bit	CCW_R
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the radius of the arc	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

1

3. Suitable soft component

ord	Operand				Constant	Module						
ora		D^*	FD	TD^*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	٠	٠	•	•							
	S1	•	•	•	•							
	S2	•	•	•	•							
	52	•	•	•	•							
Bit	Operand				System		1		<u> </u>			I
Bit		X				C*	Dnn	n	<u> </u>		<u> </u>	
Bit					System	C*	Dnn	n	<u> </u>	<u> </u>	1	

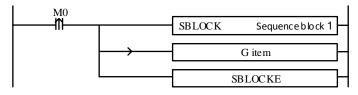
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter se	etting
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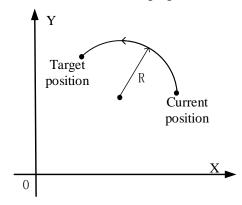
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Radius	The path of an arc varies with its radius.	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	Must set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the CCW_R instruction of arc interpolation (mode 1) is executed, the two axes will run at the highest synthesis speed. As shown in the following figure:



CCW_R anticlockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

		G Instruct	ion	×
Skip		Comment: anticlo	ckwise	
CCW_R	anticloc	kwise		~
		Params	Register	Absolute
•	S0	final position	DO	Absolute
	S1	final position	D10	Absolute
	S2	radius	D20	
	DO	axis 1	ΥΟ	params
	D1	axis 2	Ψ1	params
			ОК	Cancel

Instruction configuration

Config 🗸 Delete 🛛 init axis 🔹 config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		Ľ
YO axis-Common-Parameters setting-mechanical back to	negative		
YO axis-Common-Parameters setting-Motor operating mo	Position	Mode	
YO axis-Common-Parameters setting-Pulse unit	1 นก		
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	
YO axis-Common-pulse send mode	complete	mode	
YO axis-Common-Pulse num (1)	1		
YO axis-Common-1um(revolve)	1		
YO axis-Common-Pulse direction terminal	¥4		
YO axis-Common-Delayed time of pulse direction (ms)	10		~
YO axis-Common-lum(revolve) YO axis-Common-Pulse direction terminal	1 ¥4		

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	~
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	^
V1 axis-Common-Parameters setting-Pulse direction logic	positive log	ic
V1 axis-Common-Parameters setting-enable soft limit	disable	- 12
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting Motor operating mo	Position Mod	e
V1 axis-Common-Parameters setting-Pulse unit	1 um	
V1 axis-Common-Parameters setting-Interpolation coor	Cross coordi	
¥1 axis-Common-pulse send mode	complete mod	e
Y1 axis-Common-Pulse num (1)	1	
Y1 axis=Common=1um(revolve)	1	
Y1 axis-Common-Pulse direction terminal	¥5	
Y1 axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the circle radius.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, when M0 rises, execute CCW_R command, move from the starting position (1000, 1000) to the target position at the default speed of 1000Hz.
- (1) When the end point is in absolute mode, the target position is (5000,2000)

(2) When the end point is in the relative mode, the target position is (6000,3000)

- When the CCW_R instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.
- When the radius is positive, the arc is inferior; when the radius is negative, it is major arc.

Mode 2: CCW_R anticlockwise arc VM

1. Instruction overview

Anticlockwise arc interpolation instruction, operate according to the set maximum synthetic speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Anticlockwi	se arc interpolation [CCW_R]		
16-bit	-	32-bit	CCW_R
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the radius of the arc	Double words, 32-bit
S3	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Operand		System									Module	
	D^*	FD	П)*	CD^*	DX	DY	DM*	DS^*	K/H	ID	QD
S0	•	•	•		•							
S1	•	•	•		•							
S2	•	•	•		•							
S3	•	•	•		•							
				6			•		•		•	•
Operand				-	stem	1	r					
	Х	Y	M*	S *	Τ*	C*	Dnm	l				
D0		•										
D1		•										

* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

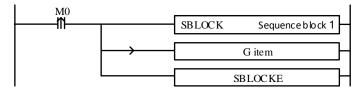
4. Parameter setting

Related parameters	Setting							Note
Final position	Determine the end point position according to							Must set
	relative/absolute mode							

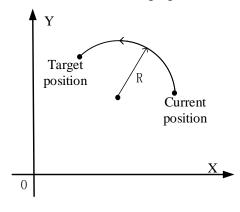
Relative/absolute	Relative: the above position as a reference; absolute: the origin as a reference	Must set
Radius	The path of an arc varies with its radius.	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of axis 1	Arbitrary specify pulse output point	Must set
Pulse output port of axis 2	Arbitrary specify pulse output point	Must set
Direction port of axis 1	Arbitrarily specify idle output points, set in system parameters	Must set
Direction port of axis 2	Arbitrarily specify idle output points, set in system parameters	Must set
Pulse unit	The pulse number or equivalent are acceptable. Set in axis 1 system parameters	Must set
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the CCW_R instruction of arc interpolation (mode 2) is executed, the two axes will run at the set max synthesis speed. As shown in the following figure:



CCW_R anticlockwise arc interpolation

The parameter configuration is shown in the following figure:

		G Instruct	tion	×					
Skip		Comment: anticlo	ockwise VM						
CCW_R anticlockwise VM V									
		Params	Register	Absolute					
•	S0	final position	DO	Absolute					
	S1	final position	D10	Absolute					
	S2	radius	D20						
	S 3	max speed	D30						
	DO	axis 1	УО	params					
	D1	axis 2	¥1	params					
			ОК	Cancel					

Double-click G item and pop up the configuration panel. Set it as follows:

Instruction configuration

PLC1 - Pulse Set			×
Config 👻 Delete 🛛 init axis 🔷 config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		Ľ
YO axis-Common-Parameters setting-mechanical back to	negative		L
YO axis-Common-Parameters setting Motor operating mo	Position	Mode	L
YO axis-Common-Parameters setting-Pulse unit	1 um		L
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	
YO axis-Common-pulse send mode	complete	mode	L
YO axis-Common-Pulse num (1)	1		L
YO axis-Common-lum(revolve)	1		L
YO axis-Common-Pulse direction terminal	¥4		
YO axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config - Delete init axis config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	н
YO axis-group 2-Pulse default speed	1000	Ш
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	15
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set			×
Config 🝷 Delete init axis config guide			
Param SFD1036	Value		^
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
Y1 axis-Common-Parameters setting-enable soft limit	disable		Ľ
Y1 axis-Common-Parameters setting-mechanical back to	negative	2	
¥1 axis-Common-Parameters setting Motor operating mo	Positior	1 Mode	
¥1 axis-Common-Parameters setting-Pulse unit	lum		L
¥1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
Y1 axis-Common-pulse send mode	complete	e mode	
Y1 axis-Common-Pulse num (1)	1		
V1 axis-Common-1um(revolve)	1		
¥1 axis-Common-Pulse direction terminal	¥5		
Y1 axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the radius (the radius is different and the path is different), D30 specifies the max speed.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D30 = 500Hz, when M0 rises, execute CCW_R command, move from the starting position (1000, 1000) to the target position at the max speed of 500Hz.
- (1) When the end point is in absolute mode, the target position is (5000,2000)
- (2) When the end point is in the relative mode, the target position is (6000,3000)
- When the CCW_R instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.
- When the radius is positive, the arc is inferior; when the radius is negative, it is major arc.

Mode 3: CCW_R anticlockwise arc VBEM

1. Instruction overview

Anticlockwise arc interpolation instruction, operate according to the set maximum synthetic speed, start speed and stop speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Anticlockwi	Anticlockwise arc interpolation [CCW_R]							
16-bit	-	32-bit	CCW_R					
instruction		instruction						
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH					
condition		model						
Firmware	V3.3 and above	Software	V3.3 and above					

2.	Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the radius of the arc	Double words, 32-bit
S3	Specify the starting speed at the starting point of the two axes	Double words, 32-bit
S4	Specify the stop speed at the end point of the two axes	Double words, 32-bit
S5	Max speed of the two axes	Double words, 32-bit

D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand					Syst	em				Constant	Mod	lule
word		D^*	FD	TD)*	CD^*	DX	DY	DM*	DS^*	K/H	D	QD
	S0~S5	•	•	٠		•							
										•			
Bit	Operand				Sys	stem							
		Х	Y	М*	S^*	T *	C*	Dnm	ı				
	D0		•										

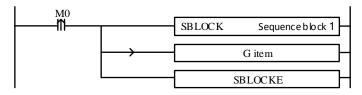
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

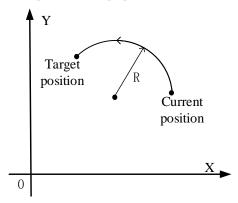
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
radius	The radius is different and the path is different	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Start speed	The start speed from the starting point	Must set
Stop speed	The stop speed at the end point	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the CCW_R instruction of arc interpolation (mode 3) is executed, the two axes will run at the set max synthesis speed, start speed and stop speed. As shown in the following figure:



CCW_R anticlockwise arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

	G Instruc	ction		×			
Skip	Comment: antic	lockwise VBEM					
CCW_R anticlockwise VBEM V							
	Params	Register	Absolute	^			
S	0 final position	DO	Absolute				
S	1 final position	D10	Absolute				
S	2 radius	D20					
S	3 begin speed	D30					
	4 end speed	D40					
	5 ^{max speed}	D50					
	axis 1	YO	params	~			
		OK	Cance	I			

Skip	Comment:	anticlockwise VBEM		
CCW_R	anticlockwise VBEM			~
	Params	Register	Absolute	^
	radius	D20		
	begin speed	D30		
	end speed	D40		
	max speed	D50		
•	DO axis 1	УО	params	
	D1 axis 2	¥1	params	
				~

Instruction configuration

Param SFD906	Value	
YO axis-Common-Parameters setting-Pulse direction logic	positive logi	c
YO axis-Common-Parameters setting-enable soft limit	disable	
VO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi.	
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-lum(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y0 system parameters (1)

PLC1 - Pulse Set							
Config 🝷 Delete 🛛 init axis 🔷 config guide							
Param SFD974	Value	^					
YO axis-group 1-Pulse frequency refresh time	1 ms refresh						
YO axis-group 2-Pulse default speed	1000						
YO axis-group 2-Acceleration time of Pulse default s	50						
YO axis-group 2-Deceleration time of pulse default s	50						
YO axis-group 2-Acceleration and deceleration time (ms)	10						
YO axis-group 2-pulse acc/dec mode	linear acc/dec						
YO axis-group 2-Max speed	100000						
YO axis-group 2-Initial speed	0						
YO axis-group 2-stop speed	0						
YO axis-group 2-FOLLOW performance param(1-100)	10						
YO axis-group 2-FOLLOW forward compensation(0-100)	0						
Read From PLC Write To PLC OK	Cancel						

Axis Y0 system parameters (2)

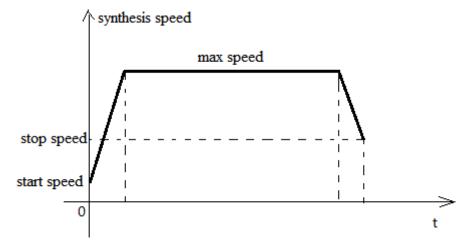
PLC1 - Pulse Set			×
Config 🝷 Delete init axis config guide			
Param SFD1036	Value		^
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
Y1 axis-Common-Parameters setting-enable soft limit	disable		Ľ
Y1 axis-Common-Parameters setting-mechanical back to	negative	2	
¥1 axis-Common-Parameters setting Motor operating mo	Positior	1 Mode	
¥1 axis-Common-Parameters setting-Pulse unit	lum		L
¥1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
Y1 axis-Common-pulse send mode	complete	e mode	
Y1 axis-Common-Pulse num (1)	1		
V1 axis-Common-1um(revolve)	1		
¥1 axis-Common-Pulse direction terminal	¥5		
Y1 axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the radius, D30 specifies the start speed, D40 specifies the stop speed, D50 specifies the max speed.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D30 = 50Hz, D40 = 20, D50 = 2000, when M0 rises, execute CCW_R command, accelerate from the starting position (1000,1000) at speed 50Hz to the maximum speed (2000Hz), and stop at the end speed of 20Hz when moving to the target position.
- (1) When the end point is in absolute mode, the target position is (5000,2000)
- (2) When the end point is in the relative mode, the target position is (6000,3000)
- When the CCW_R instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.
- When the radius is positive, the arc is inferior; when the radius is negative, it is major arc.

Note: In this mode, the starting speed (S3), the ending speed (S4) and the maximum speed (S5) are all expressed as the two-axis synthesis speed, as shown in the following figure:



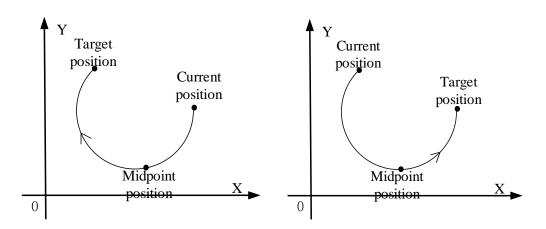
When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

When mode 3 is used, the starting and ending speed in the pulse parameter configuration tables of axis 1 and axis 2 are only effective for calculating the slope of pulse acceleration and deceleration.

2-4-8. Three points arc [ARC]

Three-point arc interpolation ARC mainly determines a section of arc clockwise or counter-clockwise through the current position of the arc, the target position and a midpoint position on the arc.

Note: The midpoint position on the arc refers to any point position between the current position and the target position on the drawn arc. As shown in the following figure:



When the target position is set to the same position as the current position (that is, two points become a point), the next circle can not be determined by two points (in three points, as long as two points coincide or three points are in a straight line, it can not form an arc), so this mode can not draw a whole circle. Three-point arc interpolation ARC has three modes, the following will be used one by one.

Mode 1: ARC three-point arc

1. Instruction overview

Three-point arc interpolation instruction, operate according to the set default speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Three-point	Three-point arc interpolation [ARC]							
16-bit	-	32-bit	ARC					
instruction		instruction						
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH					
condition		model						
Firmware	V3.3 and above	Software	V3.3 and above					

2. Operand

Operand	Function	Туре		
S0	Axis 1 target position	Double words, 32-bit		
S1	Axis 2 target position	Double words, 32-bit		
S2	Axis 1 midpoint position	Double words, 32-bit		
S3	Axis 2 midpoint position	Double words, 32-bit		
D0	Pulse output port of axis 1	Bit		

3. Suitable soft component

lord	Operand	System								Constant	Module		
Word		D^*	FD	T)*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
	Operand		System										
Bit		Х	Y	M*	S *	Τ*	С*	Dnn	1				
	D0		•										
	D1		•										

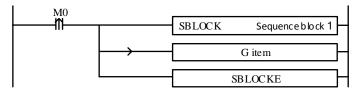
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

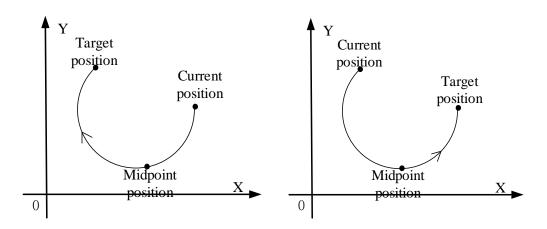
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Midpoint position	Determining the position of the midpoint of an arc	Must set
	according to its path	
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	Must set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the ARC instruction of arc interpolation (mode 1) is executed, the two axes will run at the highest synthesis speed. As shown in the following figure:



ARC arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

G Instruction										
Skip Comment: three point										
ARC three point										
	Params	Register	Absolute							
S0	final position	DO	Absolute							
► S1	final position	D10	Absolute							
S2	middle position	D20	Absolute							
S3	middle position	D30	Absolute							
DO	axis 1	YO	params							
D1	axis 2	¥1	params							
		ОК	Cancel							

Instruction configuration

PLC1 - Pulse Set			×
Config 🝷 Delete init axis config guide			
Param SFD906	Value		^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic	
YO axis-Common-Parameters setting-enable soft limit	disable		
YO axis-Common-Parameters setting-mechanical back to	negative		
YO axis-Common-Parameters setting-Motor operating mo	Position	Mode	
YO axis-Common-Parameters setting-Pulse unit	1 um		
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	
YO axis-Common-pulse send mode	complete	mode	
YO axis-Common-Pulse num (1)	1		
YO axis-Common-lum(revolve)	1		
YO axis-Common-Pulse direction terminal	¥4		
YO axis-Common-Delayed time of pulse direction (ms)	10		~
Read From PLC Write To PLC OK		Cancel	

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 👻 Delete init axis config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	~
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	1
V1 axis-Common-Parameters setting-Pulse direction logic	positive	logic
¥1 axis-Common-Parameters setting-enable soft limit	disable	
V1 axis-Common-Parameters setting-mechanical back to	negative	
V1 axis-Common-Parameters setting-Motor operating mo	Position	Mode
V1 axis-Common-Parameters setting-Pulse unit	1um	
¥1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
¥1 axis-Common-pulse send mode	complete	mode
Y1 axis-Common-Pulse num (1)	1	
Y1 axis=Common=1um(revolve)	1	
V1 axis-Common-Pulse direction terminal	¥5	
V1 axis-Common-Delayed time of pulse direction (ms)	10	

Axis Y1 system parameters

- As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the midpoint of axis 1 and D30 specifies the midpoint of axis 2.
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, when M0 rises, execute ARC command, move from the starting position (1000, 1000) to the target position at the default speed of 1000Hz.
- (1) When the end point is in absolute mode, the target position is (5000,2000)
- (2) When the end point is in the relative mode, the target position is (6000,3000)
- When the ARC instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 2: ARC three-point arc VM

1. Instruction overview

Three-point arc interpolation instruction, operate according to the set maximum synthetic speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Three-point	arc interpolation [ARC]		
16-bit	-	32-bit	ARC
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH
condition		model	
Firmware	V3.3 and above	Software	V3.3 and above

2. Operand

i		
Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Specify the midpoint of axis 1	Double words, 32-bit
S3	Specify the midpoint of axis 2	Double words, 32-bit
S4	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand		System Constar						Constant	Module			
		D^*	FD	TD)*	CD^*	DX	DY	DM*	DS^*	K/H	D	QD
	S0~S4	•	•	•		•							
	Operand				Sy	stem							
Bit		Х	Y	M^*	S^*	T*	C *	Dn.n	ı				
	D0		•										
	D1		•										

* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

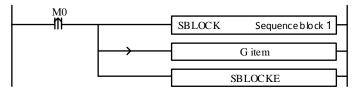
4. Parameter setting

Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	

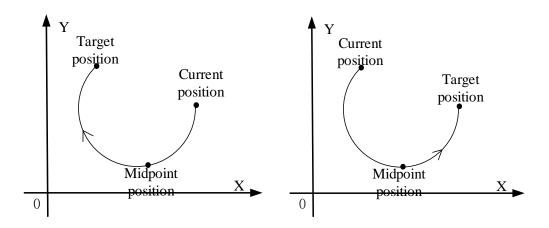
Midpoint position	Determining the midpoint position according to the arc path	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of axis 1	Arbitrary specify pulse output point	Must set
Pulse output port of axis 2	Arbitrary specify pulse output point	Must set
Direction port of axis 1	Arbitrarily specify idle output points, set in system parameters	Must set
Direction port of axis 2	Arbitrarily specify idle output points, set in system parameters	Must set
Pulse unit	The pulse number or equivalent are acceptable. Set in axis 1 system parameters	Must set
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the ARC instruction of arc interpolation (mode 2) is executed, the two axes will run at the set max synthesis speed. As shown in the following figure:



ARC arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

	G Instru	ction			×
Skip		e point '	VM		~
And three point	Params	Re	gister	Absolute	~
SO	final position		DO	Absolute	
S1	final position		D10	Absolute	
S2	middle position		D20	Absolute	
S3	middle position		D30	Absolute	
S4	max speed		D40		
► D0	axis 1		YO	params	
D1	axis 2		¥1	params	~
		[ОК	Canc	el

Instruction configuration

PLC1 - Pulse Set		×
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive	logic
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position	Mode
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
YO axis-Common-pulse send mode	complete	mode
YO axis-Common-Pulse num (1)	1	
YO axis-Common-lum(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	~
Read From PLC Write To PLC OK		Cancel

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set			×
Config 🝷 Delete init axis config guide			
Param SFD1036	Value		^
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
Y1 axis-Common-Parameters setting-enable soft limit	disable		Ľ
V1 axis-Common-Parameters setting-mechanical back to	negative	2	
Y1 axis-Common-Parameters setting Motor operating mo	Position	n Mode	
Y1 axis-Common-Parameters setting-Pulse unit	1 um		L
Y1 axis=Common=Parameters setting=Interpolation coor	Cross co	oordi	
¥1 axis-Common-pulse send mode	complete	e mode	
Y1 axis-Common-Pulse num (1)	1		
Y1 axis-Common-1um(revolve)	1		
V1 axis-Common-Pulse direction terminal	¥5		
Y1 axis-Common-Delayed time of pulse direction (ms)	10		v
Read From PLC Write To PLC OK		Cancel	

Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the midpoint of axis 1 and D30 specifies the midpoint of axis 2, D40 specifies the max speed.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: $1Hz \sim 100 KHz$; Acceleration and deceleration time: $0 \sim 65535 ms$.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 500Hz, when M0 rises, execute ARC command, move from the starting position (1000, 1000) to the target position at the max speed of 500Hz.
- (1) When the end point is in absolute mode, the target position is (5000,2000)
- (2) When the end point is in the relative mode, the target position is (6000,3000)
- When the ARC instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Mode 3: ARC three-point arc VBEM

1. Instruction overview

Three-point arc interpolation instruction, operate according to the set maximum synthetic speed, start speed and stop speed. This instruction can only be used in BLOCK. See Section 2-2 for specific usage.

Three-point	Three-point arc interpolation [ARC]						
16-bit	-	32-bit	ARC				
instruction		instruction					
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH				
condition		model					
Firmware	V3.3 and above	Software	V3.3 and above				

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	Axis 2 target position	Double words, 32-bit
S2	Axis 1 midpoint position	Double words, 32-bit
S3	Axis 2 midpoint position	Double words, 32-bit
S4	Specify the starting speed at the starting point of	Double words, 32-bit
	the two axes	
S5	Specify the stop speed at the end point of the two	Double words, 32-bit
	axes	
S6	Max speed of the two axes	Double words, 32-bit

D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

3. Suitable soft component

Word	Operand					Syst	em				Constant	Mod	lule
word		D^*	FD	TĽ)*	CD*	DX	DY	DM*	DS^*	K/H	D	QD
	S0~S6	•	•	•		•							
							•			•		•	
	Operand		System										
Bıt	operana				- J -								
Bit	operana	X	Y	M*	S*	T*	C*	Dnm	1				
Bıt	D0	X	Y •	M*	-	1	C*	Dn.m	1				

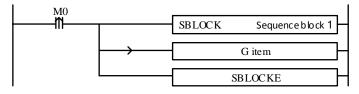
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

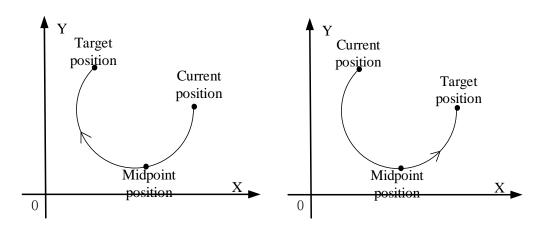
Related parameters	Setting	Note
Final position	Determine the end point position according to relative/absolute mode	Must set
Relative/absolute	Relative: the above position as a reference; absolute: the origin as a reference	Must set
Midpoint position	Determine the midpoint position according to the shape of the arc	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Start speed	The start speed from the starting point	Must set
Stop speed	The stop speed at the end point	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	The pulse number or equivalent are acceptable. Set in	Must set
	axis 1 system parameters	
Default speed	set in axis 1 group 2 parameters	No need to set
Acceleration time	Set in axis 1 group 2 parameters	No need to set
Deceleration time	Set in axis 1 group 2 parameters	No need to set

Function and action

《Instruction format》



When the ARC instruction of arc interpolation (mode 3) is executed, the two axes will run at the set max synthesis speed, start speed and stop speed. As shown in the following figure:



ARC arc interpolation

The parameter configuration is shown in the following figure: Double-click G item and pop up the configuration panel. Set it as follows:

G Instruction						
Skip Comment: three	point VBEM					
ARC three point VBEM			~			
Params	Register	Absolute	^			
SO final position	DO	Absolute				
S1 final position	D10	Absolute				
S2 middle position	D20	Absolute				
S3 middle position	D30	Absolute				
S4 begin speed	D40					
S5 end speed	D50					
S6 max speed	D60		~			
50	ОК	Cance	ł			

Skip	Comment: three	e point VBEM		
ARC three	e point VBEM			~
	Params	Register	Absolute	^
	middle position	D30	Absolute	
	begin speed	D40		
	end speed	D50		
	max speed	D60		
۱.	DO axis 1	УО	params	
	D1 axis 2	¥1	params	
			1	v

Instruction configuration

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive la	gic
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting Motor operating mo	Position Mo	de
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross coord	li
YO axis-Common-pulse send mode	complete mo	de
YO axis-Common-Pulse num (1)	1	
YO axis-Common-1um(revolve)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	~
Read From PLC Write To PLC OK	Ca	ncel

Axis Y0 system parameters (1)

PLC1 - Pulse Set		×
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD974	Value	^
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	
YO axis-group 2-Max speed	100000	
YO axis-group 2-Initial speed	0	
YO axis-group 2-stop speed	0	
YO axis-group 2-FOLLOW performance param(1-100)	10	
YO axis-group 2-FOLLOW forward compensation(0-100)	0	
Read From PLC Write To PLC OK	Cancel	

Axis Y0 system parameters (2)

PLC1 - Pulse Set			×	
Config 🝷 Delete init axis config guide				
Param SFD1036	Value		^	
V1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic		
¥1 axis-Common-Parameters setting-enable soft limit	disable		Ľ	
V1 axis-Common-Parameters setting-mechanical back to	negative	2		
V1 axis-Common-Parameters setting Motor operating mo	Position	1 Mode		
V1 axis-Common-Parameters setting-Pulse unit	1 um		L	
Y1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi		
¥1 axis-Common-pulse send mode	complete	e mode		
V1 axis-Common-Pulse num (1)	1			
Y1 axis-Common-1um(revolve) 1				
¥1 axis-Common-Pulse direction terminal	¥5		Ŀ	
Y1 axis-Common-Delayed time of pulse direction (ms)	10		~	
Read From PLC Write To PLC OK		Cancel		

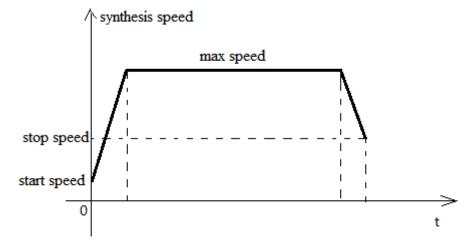
Axis Y1 system parameters

• As shown in the figure, D0 specifies the final position of axis 1 and D10 specifies the final position of axis 2, D20 specifies the midpoint position of axis 1, D30 specifies the midpoint position of axis 2, D40 specifies the start speed, D50 specifies the stop speed, D60 specifies the

max speed.

- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: 1Hz ~ 100KHz; Acceleration and deceleration time: $0 \sim 65535$ ms.
- Location movement can be viewed in equivalent cumulative registers HSD2 and HSD6.
- Assuming HSD2 = 1000, HSD6 = 1000, D0 = 5000, D10 = 2000, D40 = 50Hz, D50 = 20, D60 = 2000, when M0 rises, execute ARC command, accelerate from the starting position (1000,1000) at speed 50Hz to the maximum speed (2000Hz), and stop at the end speed of 20Hz when moving to the target position.
- (1) When the end point is in absolute mode, the target position is (5000,2000)
- (2) When the end point is in the relative mode, the target position is (6000,3000)
- When the ARC instruction is running, the pulse flag bit corresponding to its output port Y will be set on.
- The completion of the interpolation instruction can be judged by BLOCK executing flag bit. For example, the flag bit of BLOCK1 is SM300, when SM300 changes from ON to OFF, it means that BLOCK1 has finished executing.

Note: In this mode, the starting speed (S4), the ending speed (S5) and the maximum speed (S6) are all expressed as the two-axis synthesis speed, as shown in the following figure:



When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

When mode 3 is used, the starting and ending speed in the pulse parameter configuration tables of axis 1 and axis 2 are only effective for calculating the slope of pulse acceleration and deceleration.

2-4-9. Follow [FOLLOW] [FOLLOW_AB]

Follow-up instructions are divided into single-phase incremental follow-up [FOLLOW] and AB phase follow-up [FOLLOW_AB], which will be described in detail below.

1. Instruction overview

Single-phase/AB-phase high-speed counter follow instructions. The instructions can be written directly in the main program or process.

Follow instruction [FOLLOW] [FOLLOW_AB]						
16-bit	FOLLOW, FOLLOW_AB	32-bit	-			
instruction		instruction				
Execution	Rise/fall edge of coil	Suitable	XDM, XDME, XLME, XDH			
condition		model				
Firmware	V3.3 and above	Software	V3.3 and above			

2. Operand

Operand	Function	Туре
S0	Single-phase/AB phase high speed counter	Double words, 32-bit
S 1	Register address of multiplication coefficient	Single word, 16-bit
S2	Register address of division coefficient	Single word, 16-bit
S3	System parameter block number	Single word, 16-bit
D	Pulse output port	Bit

3. Suitable soft component

XX 7 1	d Operand System Constant Module						hule						
Word	Operand		1				1		1	1			
		D^*	FD	TĽ)*	CD^*	DX	DY	DM*	DS^*	K/H	D	QD
	S0	Onl	Only can be High speed counter										
	S1 • • • • • •					•	•						
	S2	•	•	•		•						•	•
	S3	•	•	•		•					•	•	•
	Operand	System											
Bit		Х	Y	M*	S^*	T *	C *	Dn.m	ı				
	D		•										

* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

Related parameters	Settings	Note		
High speed counter	The high-speed counter corresponding to FOLLOW must be single-phase incremental mode The high-speed counter corresponding to FOLLOW_AB must be AB phase mode.	Must set		
Multiplication coefficient/division coefficient	Range: -1000~1000 and not equal to 0 (follow-up instructions will not be executed when out of range). The multiplication coefficient/division coefficient is negative to indicate the positive count and send the reverse pulse. Dynamic modifications can take effect immediately.	Must set		
System parameter block number				
Pulse output port	Arbitrary designated pulse output point	Must set		
Pulse direction	It can be set in the selected system parameter block or set separately.	Must set		
Pulse unit	Must set to pulse number, please set in the system parameter of the output axis	Must set		
FOLLOW	1~100 (report error when out of range), default value is	No need to		
performance parameter	50	set		
FOLLOW	FOLLOW 0~100 (report error when out of range), default value			
feedforward compensation				
Positive/negative limit				
Positive/negative value of soft limit	No need to set			

Function and action

《Instruction format》

For single-phase incremental mode high speed counter:

For AB-phase mode high speed counter:

M0		<u>(S0)</u>	<u>(S1)</u>	<u>(S2</u>)	<u>(S3)</u>	D	
	FOLLOW_AB	HSC0	HD0	HD1	D0	Y0	

- FOLLOW/FOLLOW_AB instruction is a servo function. Through the pulse feedback of encoder or hand pulse generator, the frequency and number of input pulses are measured by PLC in real time. Through the proportional relationship between multiplication coefficient and division coefficient, the corresponding pulse frequency and the number of pulses are output to control the stepping or servo motor.
- This instruction is generally used for manual adjustment of CNC system, and it is used for advancing and retreating of the operating table of the pulse generator by hand. It can also be used in some special projects where precise synchronous control is needed.
- Pulse output is based on the variation of HSC0, that is to say, in 4-time mode, if the multiplier/divider coefficient is 1, the output of the pulse is equal to 4 times the input of the pulse. The number of pulses at the output port is stored in the pulse cumulative register, namely HSD0 (double word), HSD4 (double word)... And so on.
- For FOLLOW instructions, the high-speed counter inputs a single-phase pulse, so the number of Y-port pulses is increasing regardless of the input inversion, and the corresponding pulse direction terminal is always ON, which will not be OFF when inversion occurs.
- For FOLLOW_AB instruction, the input of high-speed counter is AB phase pulse. Y port will increase and decrease with the increase of input pulse, and the direction is the same as that of high-speed counter input.
- The forward and reverse flag bit of the follow-up instruction is the direction flag bit of the high-speed counter.
- When the Y0 port outputs the pulse, the SM1000 will be set on.
- Follow-up instruction supports hard limit, soft limit, emergency stop and slow stop functions. See the description of the parameters of the pulse system.
- XDM-24/32 supports 4 channels, XDM-60T10 supports 10 FOLLOW instructions, and can execute 4 or 10 FOLLOW instructions simultaneously.

Note:

- (1) During operation, the corresponding HSCD and HSD can not be changed arbitrarily. If it needs to be cleared, it must be cleared at the same time.
- (2) If the high-speed counter needs to be cleared, the clearing instruction must be executed after the condition of FOLLOW or FOLLOW_AB is disconnected and at least two scanning cycles are spaced.

For example, after disconnecting the condition X2, a short delay is made, and the clearing instruction is executed after the time is up.

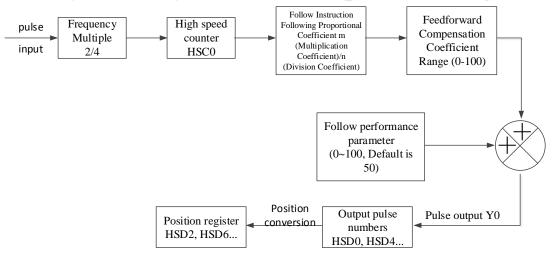
	2 	FOLLOW_AE	HSC0 D23	3 D25 K1 Y0	┧
	2				
H	Ĩ	TMR TO	K1	K100	Ъ
	0				
H	N 	DMOV	K0 H	HSC0	Э

(3) It is forbidden to write two (or more) follow-up instructions to the same high-speed counter

in the program.

- (4) It is forbidden to have both FOLLOW (or FOLLOW_AB) and CNT (or CNT_AB) instructions for the same high-speed counter in the program.
- (5) The follow-up instruction can be executed simultaneously with the interpolation instruction, but the output port can not overlap.
- (6) High-speed counting must be given pulse input by external input terminal, and can not be used by HSCW writing mode.
- (7) Follow-up instructions cannot use the same high-speed counter as high-speed counting read-write instructions. When FOLLOW instructions need to write multiple instructions from the same high-speed counting source, they can be written in different processes, and only one process can be conducted at the same time.
- (8) FOLLOW instruction resource conflict is corresponding to AB phase high-speed counting resource conflict.

The following is instruction diagram of FOLLOW/ FOLLOW_AB(take Y0 as an example):



The relationship between follow-up instructions and motion control instructions:

(1) The follow-up command can be used separately from the motion control command. However, when manual pulse generator is needed to adjust the coordinate position, it is necessary to establish the relationship between follow-up and motion control.

(2) When the pulse mode is equivalent, the change of the number of pulses is converted to the change of the position of the corresponding output axis, which is reflected in the HSD2 (double-word) register, so that the follow-up instructions and the motion control system constitute an organic whole. Therefore, the following changes can be directed either to axis 1 or to axis 2.

(3) The change of position is consistent with the change of pulse, which can only increase but not decrease.

FOLLOW performance parameters:

The function of this parameter is similar to the rigidity function of servo driver. The smaller the setting value of this parameter is, the smaller the servo rigidity will be (the greater the delay); the larger the setting value of this parameter is, the greater the servo rigidity will be (the smaller the delay will be). Setting range: $1 \sim 100$ (error will be reported if exceeding range), default setting is 50.

FOLLOW feedforward compensation:

(1) There is always a certain delay between receiving and sending out pulses in PLC. In order to reduce the lag effect, the feedforward compensation parameters can be modified to compensate for the lag effect, so that the pulse output has a certain advance, to offset the lag effect. However, if the feedforward parameters are set large, it may lead to entering the compensation cycle, which will lead to the continuous jitter of the motor at the end of the follow-up. Setting range: 0-100 (error will be reported when exceeding the range), default is 0, equivalent to no feedforward compensation.

(2) Normally, this parameter does not need to be set.

Limit bit description (fit for all motion instructions):

(1) When the positive motion is detected, the rising edge of the positive limit is detected, and the deceleration begins until it stops. At this time, only the negative motion can be achieved. In the process of negative motion, only when the descending edge of positive limit is detected, can two-way motion be achieved.

(2) When the negative motion is detected, the rising edge of the negative limit is detected, and the deceleration begins until it stops. At this time, only the positive motion can be achieved. In the process of positive motion, only after the negative limit drop edge is detected, can the two-way motion be achieved.

(3) When the instruction starts to execute, it can only move negatively if it is in the positive limit. If it is in the negative limit, it can only move forward.

2-5. Hardware wiring and precautions

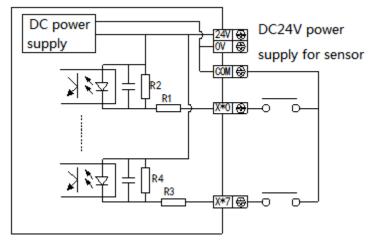
2-5-1. Input wiring

XD series PLC input is divided into NPN and PNP modes (XL series only supports NPN type wiring). The internal structure and wiring mode of the two modes are introduced below.

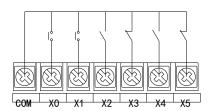
2-5-1-1. XD series PLC input wiring

• NPN mode

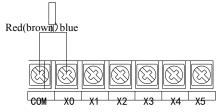
Input signal voltage	DC24V±10%				
Input signal current	7mA/DC24V				
Input ON current	Below 4.5mA				
Input OFF current	Below 1.5mA				
Input response time	About 10ms				
Input signal made	Contact input or NPN open collector				
Input signal mode	transistor				
Circuit insulation	Photoelectric coupled insulation				
Input action display	LED lights when input is ON				



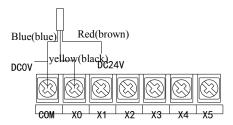
XD series NPN wiring example



Switch button wiring



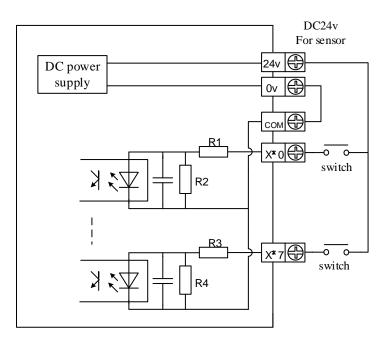
two-wire (NO or NC) proximity switch wiring



Three-wire (NPN) proximity switch wiring

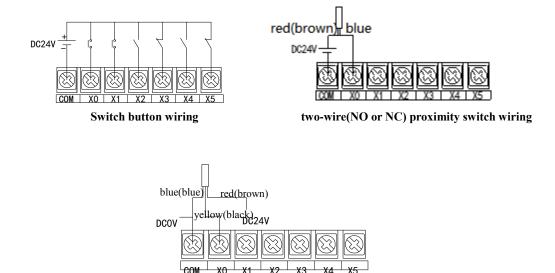
• PNP mode

Input signal	DC24V±10%
voltage	
Input signal	7mA/DC24V
current	
Input ON current	Below 4.5mA
Input OFF current	Below 1.5mA
Input response	About 10ms
time	
Input signal mode	Contact input or PNP open collector
Input signal mode	transistor
Circuit insulation	Photoelectric coupled insulation
Input action	LED lights when input is ON
display	



430

PNP wiring example



Three-wire (PNP) proximity switch wiring

2-5-1-2. XL series PLC input wiring

• Input specifications (NPN mode)

XL general models:

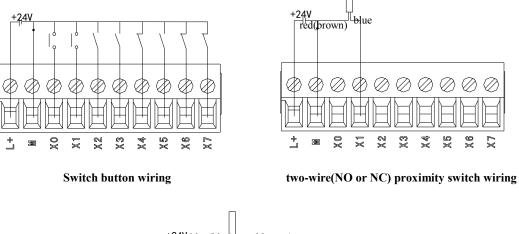
Input signal voltage	DC24V±10%
Input signal current	7mA/DC24V
Input ON current	Below 4.5mA
Input OFF current	Below 1.5mA
Input response time	About 10ms
Innut signal made	Contact input or NPN open collector
Input signal mode	transistor
Circuit insulation	Photoelectric coupled insulation
Input action display	LED lights when input is ON

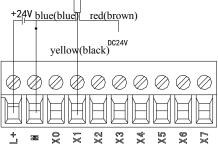
XL5E-64T6:

Input signal voltage	DC24V±10%		
Input signal current	7mA/DC24V		
Input ON voltage	Below 9V		
Input OFF voltage	Above 19V		
Input response time	About 10ms		
Innut signal made	Contact input or NPN open collector		
Input signal mode	transistor		
Circuit insulation	Photoelectric coupled insulation		



• XL series PLC NPN input wiring example





Three-wire (NPN) proximity switch wiring

2-5-1-3. Attentions for connection of input points

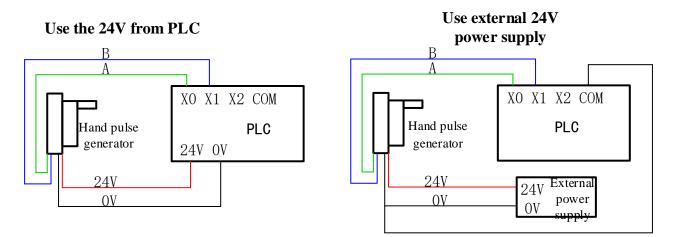
- The input type must be OC signal (collector open circuit signal).
- DC24 does not need to connect DC0V to COM of input point if it uses DC24V provided by PLC body; if it uses external power supply, it must be connected.

2-5-1-4. Hand pulse generator connection

Hand pulse generator is also known as hand artery impulse generator, hand pulse, electronic handwheel and so on. It is used to zero correction and signal segmentation for CNC machine tools, printing machinery, etc. It works like an encoder.



The output signal of the hand pulse generator must be OC (collector open circuit signal) DC24V type. Generally, there will be five wires, three signal wires (A, B, Z), two power wires (24V, 0V), signal wires connected with the corresponding high-speed counting input port of the PLC. The power supply can be supplied by the output 24V of the PLC or by the switching power supply.



Note: When using external switching power supply, the COM of PLC input should be short connected with 0V.

2-5-2. Output wiring

For XD/XL series PLC, the output terminal of motion control command needs high-speed pulse output terminal. Other transistors are ordinary optocouplers. For specifications and introduction, please refer to "XD/XL Series PLC Hardware User Manual".

Model		XDM-24T4/32T4/60T4/60T4L	XDM-60T10, XDME-60T10
		XDM-60T4, XDH-60T4,	
		XLME-32T4	
High speed	pulse	Y0~Y3	Y0~Y11
output port			

2-5-2-1. High speed pulse output specification parameters

External power supply	DC5~30V
Action display	LED light
Max current	50mA
Pulse max output	100KHz
frequency	

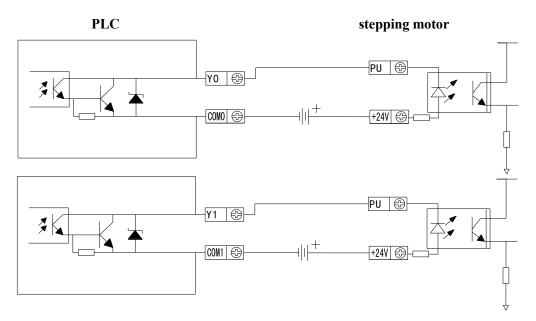
Note: PLC can output 100KHz ~ 200KHz pulses, but it can not guarantee the normal operation of all servos. Please connect about 500Ω resistance between the output and 24V power supply.

2-5-2-2. Cautions for output point connection

If it is XDM-60T10-E or XDME-60T10-E, the output point Y12-Y27 should be used when the output point of the photocoupler is connected with the power load.

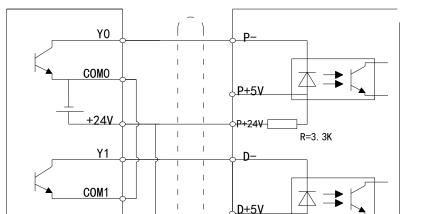
2-5-2-3. Connecting with stepping driver/servo driver

Below is the diagram of the connection between the T-type output terminal and the stepper motor driver.



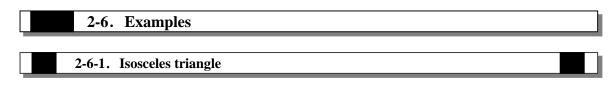
Note: If the pulse and direction terminals of the stepper motor are driven by DC5V, please connect $2.2K \Omega$ resistance behind the pulse and direction terminals.

Below is the diagram of the connection between the T-type output terminal and XINJE servo motor driver.

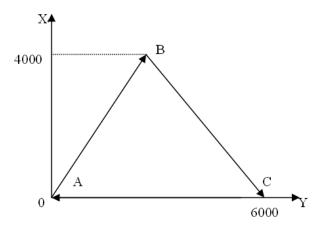


Note: Please suspend P+5V and D+5V.

Detailed hardware wiring diagram refers to "XD/XL Series PLC Hardware User Manual.



Step out of an isosceles triangle with a side length of 5000 and a bottom of 6000. The starting point is A (0, 0), from A (0, 0) to B (3000, 4000), then from B (3000, 4000) to C (6000, 0), and finally from C (6000, 0) back to the starting point A (0, 0), as shown in the figure:



Explain:

The two axes are designated Y0 (Y axis) and Y1 (X axis). The corresponding directional terminals are Y4 and Y5. The coordinates of B point are (D0, D10), C point are (D2, D12), A point is (D4, D14), the speed is 1000Hz, and the acceleration and deceleration time are 50ms. The relevant parameters are set as follows:

coordinates	X axis	X axis set	ting value	Y axis	Y axis set	ting value
coordinates	address	absolute	relative	address	absolute	relative
B point	D0	3000	3000	D10	4000	4000
C point	D2	6000	3000	D12	0	-4000
A point	D4	0	-6000	D14	0	0
Default spe	eed (Hz)	1000				

Acceleration/deceleration time (ms)	50
X axis	Y0-pulse; Y4-direction
Y axis	Y1-pulse; Y5-direction

Program I (absolute mode):

Add the G item in BLOCK, add three LIN instructions in it, as shown below:

		Edit Seque	ence Block 1	×
Comment: S	equence Block1			
Insert - E	dit Delete Up	wards Downwar	ds	
Index	Skip	Comment	Output	
1		line	LIN DO DIO YO YI	
2		line	LIN D2 D12 YO Y1	
3		line	LIN D4 D14 YO Y1	
				OK Cancel

The configuration of the three instructions:

	G Instruct	tion	
Skip	Comment: line		
LIN line			~
	Params	Register	Absolute
	final position	DO	Absolute
	final position	D10	Absolute
•	axis 1	УО	params
	axis 2	¥1	params
		ОК	Cancel

The first one (A→B)

	G Instruct	ion	×
Skip	Comment: line		
LIN line			~
	Params	Register	Absolute
	final position	D2	Absolute
	final position	D12	Absolute
•	axis 1	УО	params
	axis 2	¥1	params
		ок	Cancel

The second one $(B \rightarrow C)$

	G Instruction	on	×
Skip	Comment: line		
LIN line			~
	Params	Register	Absolute
	final position	D4	Absolute
	final position	D14	Absolute
•	axis 1	YO	params
	axis 2	¥1	params
		ОК	Cancel

The third one $(C \rightarrow A)$

	G Instruct	ion	×
Skip	Comment: line		
LIN line			~
	Params	Register	Absolute
	final position	DO	Absolute
	final position	D10	Absolute
•	axis 1	УО	params
	axis 2	¥1	params
		ОК	Cancel

Double click parameters, configure the Y0 axis parameters, as shown below:

PLC1 - Pulse Set		×
Config 👻 Delete init axis config guide		
Param SFD906	Value	>
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
YO axis-Common-Parameters setting-Pulse unit	pulse number	
YO axis-Common-Parameters setting-Interpolation coor Cross coordi		
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-Offset (1)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms)	10	
Read From PLC Write To PLC OK	Cancel	

Y0 axis pulse direction terminal is set to Y4

PLC1 - Pulse Set		
Config - Delete init axis config guide		
Param SFD974	Value	
YO axis-group 1-Initial speed	0	- 1
YO axis-group 1-stop speed	0	
YO axis-group 1-FOLLOW performance param(1-100)	10	
YO axis-group 1-FOLLOW forward compensation(0-100)	0	
YO axis-group 1-Pulse frequency refresh time	1 ms refre	sh
VO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default s	50	
YO axis-group 2-Deceleration time of pulse default s	50	
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc	/dec
YO axis-group 2-Max speed	100000	
Read From PLC Write To PLC OK	Ca	ancel

Y0 axis pulse default speed is set to 1000, acc/dec time is 50ms

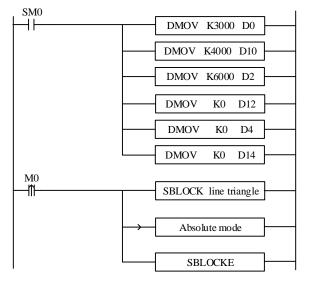
Double click parameters, configure the parameters of Y1 axis, as shown below:

	G Instructio	on	×
Skip	Comment: line		
LIN line			*
	Params	Register	Absolute
	final position	DO	Absolute
	final position	D10	Absolute
•	axis 1	YO	params
	axis 2	Ψ1	params
		ОК	Cancel

Config - Delete init axis config guide		
Param SFD1036	Value	1
Y1 axis-Common-Parameters setting-Pulse direction logic	positive logic	
V1 axis-Common-Parameters setting-enable soft limit	disable	Ľ
V1 axis-Common-Parameters setting-mechanical back to	negative	Ш
Y1 axis-Common-Parameters setting-Motor operating mo	Position Mode	Ш
Y1 axis-Common-Parameters setting-Pulse unit	pulse number	Ш
Y1 axis-Common-Parameters setting-Interpolation coor	Cross coordi	Ш
¥1 axis-Common-pulse send mode	complete mode	1
Y1 axis-Common-Pulse num (1)	1	1
¥1 axis-Common-Offset (1)	1	1
V1 axis-Common-Pulse direction terminal	¥5	1
V1 axis-Common-Delayed time of pulse direction (ms)	10	

Y1 axis pulse direction terminal is set to Y5

After setting up, click OK to generate the program shown in the following figure in the ladder diagram. Write the set values in D0, D2, D4, D10, D12, D14. When M0 is turned on once, perform BLOCK once, and take a triangular route.



Program II (relative mode):

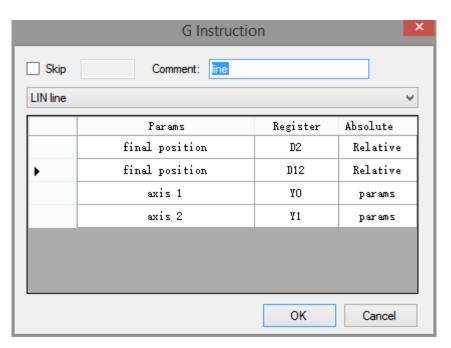
Three linear interpolation instructions [LIN] are added to the BLOCK by using the relative mode, as shown in the following figure:

		Edit Sec	quence Block 1	>
Comment: Se	quence Block1			
Insert + Ed	lit Delete Up	wards Downw	wards	
Index	Skip	Comment	Output	
1		line	LIN DO DIO YO YI	
2		line	LIN D2 D12 YO Y1	
3		line	LIN D4 D14 YO Y1	
			OK Car	ncel

The three instructions are shown as below:

	G Instruct	ion	×
Skip	Comment: ine		
LIN line			~
	Params	Register	Absolute
	final position	DO	Relative
•	final position	D10	Relative
	axis 1	YO	params
	axis 2	¥1	params
		ОК	Cancel

First one (A→B)



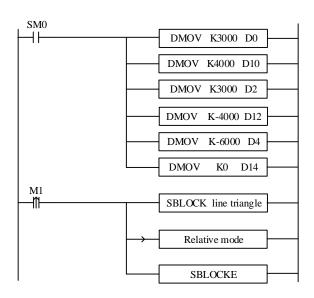
The second one $(B \rightarrow C)$

	G Instructi	on	×
Skip	Comment: ine		
LIN line			~
	Params	Register	Absolute
	final position	D4	Relative
•	final position	D14	Relative
	axis 1	УО	params
	axis 2	¥1	params
		ОК	Cancel

The third one $(C \rightarrow A)$

Double-click "parameters" to configure parameters of Y0 and Y1 axis [pulse direction terminal], [group 2 parameters - pulse default speed (Hz)], [group 2 parameters - pulse default speed acceleration time (ms)], [group 2 parameters - pulse default speed deceleration time (ms)] in the same absolute mode, which will not be described here.

After setting up, click OK to generate the program shown in the following figure in the ladder diagram. Assuming that the current values of HSD2 (double word) and HSD6 (double word) are all 0, the set values are written in D0, D2, D4, D10, D12 and D14. When M1 is set ON once, BLOCK is executed once, and a triangular line is taken.



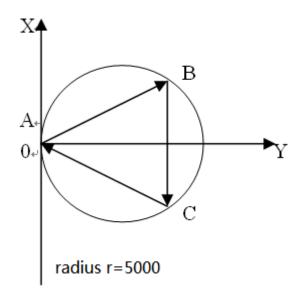
Note:

(1) The current position pulses of the two axes can be monitored by HSD2 (double word) and HSD6 (double word).

(2) The output terminals of the two axes correspond to Y0 and Y1 respectively, while the output terminals of the direction correspond to Y4 and Y5 respectively.

2-6-2. Circle + inscribed triangle

First step out of a circle with radius R = 5000 clockwise, and then follow the pattern of the inner regular triangle of the circle. The starting point is A (0, 0). First, follow the order of A (0, 0) \rightarrow B (7500, 4285) \rightarrow C (7500, -4285) \rightarrow A (0, 0) to form the circle, then from A(0, 0) to B (7500, 4285), and then from B (7500, 4285) to C(7500, -4285) points, and finally returns from C (7500, -4285) points to the starting point A (0, 0) and completes an inner regular triangle of a circle, as shown in the figure.



Note:

Two axes are designated as Y0 and Y1 axis, corresponding direction terminals are Y4 and Y5, B point coordinates are (D20, D22), C point coordinates are (D30, D32), A point coordinates are (D40, D42), starting speed is 50 Hz, stop speed is 50 Hz, maximum speed is 2000 Hz, default speed is 1000 Hz, acceleration and deceleration time is 50 ms, the specific parameters are set as follows:

Function	Register or coil address	Value
Endpoint coordinates	D0	0
of circular arcs	D2	0
Center coordinates	D4	5000
	D6	0
B point coordinates	D20	7500
	D22	4285
C point coordinates	D30	7500
	D32	-4285
A point coordinates	D40	0
	D42	0
Starting speed (Hz)	D8	50
Stop speed (Hz)	D10	50
Max speed (Hz)	D12	2000
Default speed (Hz)	-	1000
Acc/dec time (ms)	-	50
X aixs	Y0 pulse, Y4 direction	
Y axis	Y1 pulse, Y5 direction	

Program (absolute mode):

Because of the coincidence of the starting point and the end point, the command "CW clockwise arc VBEM" is chosen here, and the command "LIN line VBEM" is used in the triangle. Insert G instruction into BLOCK and write four interpolation instructions, as shown in the following figure:

Index	Skip	Comment	Output
1		clockwise VBEM	CW DO D2 D4 D6 D8 D10 D12 YO Y1
2		line VBEM	LIN D20 D22 D8 D10 D12 Y0 Y1
3		line VBEM	LIN D30 D32 D8 D10 D12 Y0 Y1
4		line VBEM	LIN D40 D42 D8 D10 D12 Y0 Y1

The four instructions are shown as below:

Skip	Comment: cloc	kwise VBEM		
CW clock	wise VBEM			~
	Params	Register	Absolute	^
	final position	DO	Absolute	
	final position	D2	Absolute	
	center position	D4	Relative	
•	center position	D6	Relative	
	begin speed	D8		
	end speed	D10		
	max speed	D12		~
		ОК	Cance	

Instruction ① settings (1)

Skip	Comment: cloc	kwise VBEM		
CW clockwi	se VBEM			~
	Params	Register	Absolute	^
•	center position	D6	Relative	
	begin speed	D8		
	end speed	D10		
	max speed	D12		
	axis 1	УО	params	
	axis 2	¥1	params	
			1	~

Instruction (1) settings (2)

	G Instru	iction		×
Skip	Comment: line	VBEM		
LIN line VB	EM			~
	Params	Register	Absolute	^
	final position	D20	Absolute	
	final position	D22	Absolute	
	begin speed	D8		
	end speed	D10		
	max speed	D12		
•	axis 1	УО	params	
	axis 2	Ψ1	params	\checkmark
		ОК	Cance	1

Instruction 2 settings

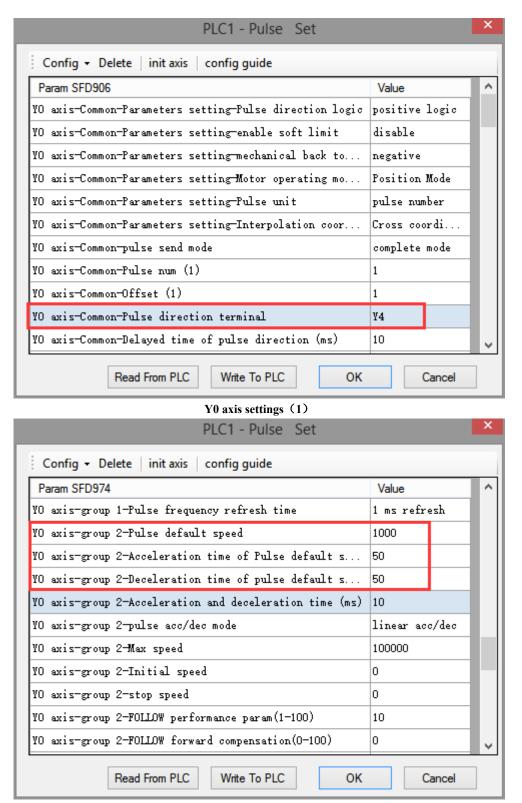
G Instruction					
Skip	Comment: line	VBEM			
LIN line VB	EM			~	
	Params	Register	Absolute	^	
	final position	D30	Absolute		
	final position	D32	Absolute		
	begin speed	D8			
	end speed	D10			
	max speed	D12			
•	axis 1		params		
	axis 2	¥1	params	~	
		ОК	Cance	, 	

Instruction ③ settings

G Instruction					
Skip	Comment: line	VBEM			
LIN line VB	EM			~	
	Params	Register	Absolute	^	
	final position	D40	Absolute		
	final position	D42	Absolute		
	begin speed D8				
	end speed D10				
	max speed D12				
۱.	axis 1	УО	params		
	axis 2 ¥1 params			~	
		ОК	Cance	<u>+</u>	

Instruction ④ settings

Double-click the "parameters" to configure the parameters of Y0 and Y1 axis [pulse direction terminal], [group 2 parameters - pulse default speed (Hz)], [group 2 parameters - pulse default speed acceleration time (ms)], [group 2 parameters - pulse default speed deceleration time (ms)], as follows:

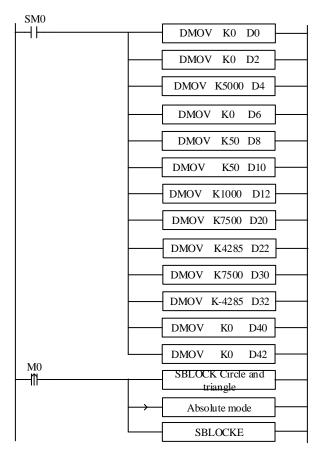


Y0 axis settings (2)

PLC1 - Pulse Set					
Config 🝷 Delete 🛛 init axis 🔷 config guide					
Param SFD1036	Value	^			
Y1 axis-Common-Parameters setting-Pulse direction logic	positive logic				
V1 axis-Common-Parameters setting-enable soft limit	disable	17			
V1 axis-Common-Parameters setting-mechanical back to	negative				
Y1 axis-Common-Parameters setting Motor operating mo	Position Mode				
Y1 axis-Common-Parameters setting-Pulse unit pulse number					
Y1 axis-Common-Parameters setting-Interpolation coor	Cross coordi				
¥1 axis-Common-pulse send mode	complete mode				
V1 axis-Common-Pulse num (1)	1				
¥1 axis-Common-Offset (1) 1					
V1 axis-Common-Pulse direction terminal	¥5				
Y1 axis-Common-Delayed time of pulse direction (ms)	10				
Read From PLC Write To PLC OK	Cancel				

Y1 axis settings (1)

After setting up, click OK to generate the program shown in the following figure in the ladder diagram. Assuming that the current values of HSD2 (double-word) and HSD6 (double-word) are all 0, write the set values in the relevant registers. When M0 is turned on once, perform BLOCK once and take a triangle line once.



Note:

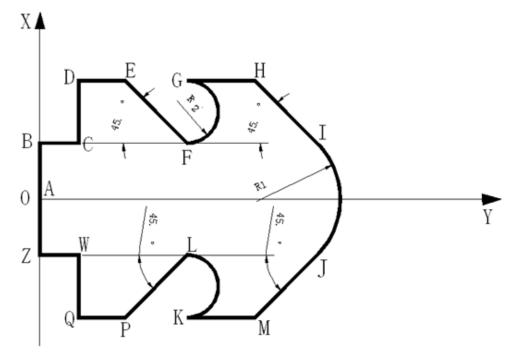
(1) The current position pulses of the two axes can be monitored by HSD2 (double word) and HSD6 (double word).

(2) The output terminals of the two axes correspond to Y0 and Y1 respectively, while the output terminals of the direction correspond to Y4 and Y5 respectively.

(3) When there are many points to go (if there are 1000 points), the ladder chart we write according to the above method will be very long, which is not conducive to the optimization of the program; therefore, we can use HMI to modify the values in the linear interpolation register to execute multiple linear interpolation instructions, in order to improve the readability of the program, optimize and reduce the scanning cycle of the program. The coordinates of each point can be set in the power-off retention register (the setting value of HMI register can be set by recipe function).

2-6-3. Line + Arc symmetric figure

As shown in following figure: starting from origin A (0, 0), and pass point $B \rightarrow C \rightarrow D \rightarrow E \rightarrow F \rightarrow G \rightarrow H \rightarrow I \rightarrow J \rightarrow M \rightarrow K \rightarrow L \rightarrow P \rightarrow Q \rightarrow W \rightarrow Z \rightarrow A$, the figure is symmetric with Y axis, AB=5000, BC=3000, CD=6000, DE=4000, R2=3000, GH=6000, R1=7070.



Note:

The two axes are designated as Y0 and Y1 axis, the corresponding directional terminals are Y4 and Y5, the default speed is 1000Hz, and the acceleration and deceleration time is 50ms, respectively. It is convenient to select the relative position mode according to the figure, so the specific parameters are set as follows:

Function	Address	Value	Function	Address	Value
		(relative)			(relative)
B point coordinates	HD0	0	C point coordinates	HD4	3000
	HD2	5000		HD6	0
D point coordinates	HD8	0	E point coordinates	HD12	4000
	HD10	6000		HD14	0
F point coordinates	HD16	6000	G point coordinates	HD20	0
	HD18	-6000		HD22	6000
H point coordinates	HD24	6000	I point coordinates	HD28	6000
	HD26	0		HD30	-6000
J point coordinates	HD32	0	M point coordinates	HD36	-6000
	HD34	-10000		HD38	-6000
K point coordinates	HD40	-6000	L point coordinates	HD44	0
	HD42	0		HD46	6000
P point coordinates	HD48	-6000	Q point coordinates	HD52	-4000
	HD50	-6000		HD54	0

W point coordinates	HD56	0	Z point coordinates	HD60	-3000	
	HD58	6000		HD62	0	
A point coordinates	HD64	0	R2 radius	HD68	3000	
	HD66	5000	R1 radius	HD70	7070	
Default speed	1000Hz					
Acc/dec time	50ms					
X axis	Y0 pulse, Y4 direction					
Y axis	Y1 pulse, Y	Y1 pulse, Y5 direction				

Program (relative mode):

Since the figure is mainly composed of straight lines and arcs, the "LIN line" instruction is chosen here, and the "CCW_R anticlockwise arc" and "CW_R clockwise arc" instruction are used for arcs. Insert G instruction into BLOCK and write 17 interpolation instructions, as shown in the following figure:

		Edit Seque	nce Block 1	>
Comment: S	equence Block1			
; Insert + E	dit Delete U	pwards Downward	s	
Index	Skip	Comment	Output	^
1		line	LIN HDO HD2 YO Y1	
2		line	LIN HD4 HD6 YO Y1	
3		line	LIN HD8 HD10 Y0 Y1	
4		line	LIN HD12 HD14 YO Y1	
5		line	LIN HD16 HD18 YO Y1	
6		anticlockwise	CCW_R HD20 HD22 HD68 YO Y1	
7		line	LIN HD24 HD26 YO Y1	
8		line	LIN HD28 HD30 Y0 Y1	~
			OK Cano	el

instruction (1) \sim (8)

Comment: S	equence Block1			
Insert + E	dit Delete	Upwards Downward	ls	
Index	Skip	Comment	Output	
9		clockwise	СW_R НДЗ2 НДЗ4 НД70 ¥0 ¥1	1
10		line	LIN HD36 HD38 YO Y1	1
11		line	LIN HD40 HD42 YO Y1	11
12		anticlockwise	CCW_R HD44 HD46 HD68 YO Y1	١.
13		line	LIN HD48 HD50 Y0 Y1	1
14		line	LIN HD52 HD54 YO Y1	
15		line	LIN HD56 HD58 YO Y1	1
16		line	LIN HD60 HD62 YO Y1	
			OK Canc	el
		Instruction	(9) ~ (16)	
17		line	LIN HD64 HD66 YO Y1	~

instruction (17)

The endpoint position of all the above instructions must be set to "relative mode", as shown in the following figure:

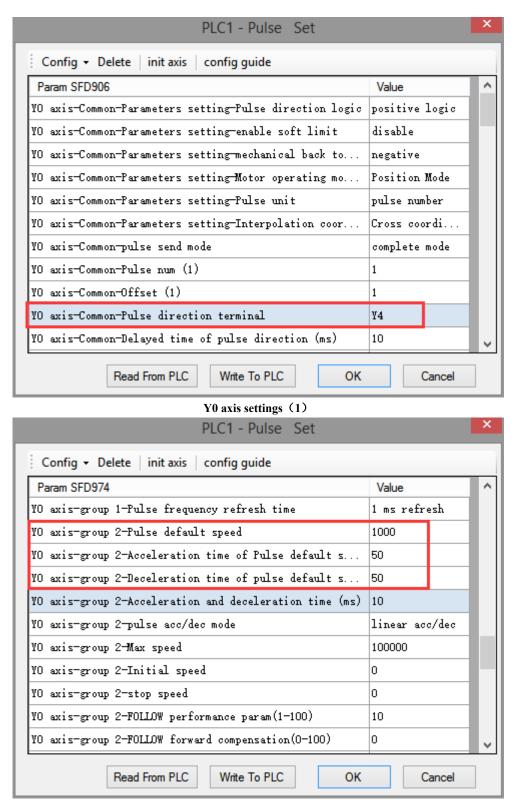
G Instruction						
Comment: ine						
		~				
Params	Register	Absolute				
final position	НОО	Relative				
final position	HD2	Relative				
axis 1	УО	params				
axis 2	¥1	params				
	ОК	Cancel				
	Comment: ine Params final position final position axis 1	Comment: Immediate Params Register final position HDO final position HD2 axis 1 YO axis 2 Y1				

	G Instruction						
Skip	Comment: anticlo	ckwise					
CCW_R ar	CCW_R anticlockwise V						
	Params	Register	Absolute				
	final position	HD20	Relative				
•	final position	HD22	Relative				
	radius	HD68					
	axis 1	ΥО	params				
	axis 2	¥1	params				
		ОК	Cancel				

G Instruction							
Skip	Comment: clockwi	ise					
CW_R c	CW_R clockwise V						
	Params	Register	Absolute				
	final position	HD32	Relative				
•	final position	HD34	Relative				
	radius	HD 70					
	axis 1	ΥО	params				
	axis 2	¥1	params				
		ОК	Cancel				

Note: The radius of the clockwise and anticlockwise arcs can only be absolute mode, and can not be modified!

Double-click the "parameters" to configure the parameters of Y0 and Y1 axis [pulse direction terminal], [group 2 parameters - pulse default speed (Hz)], [group 2 parameters - pulse default speed acceleration time (ms)], [group 2 parameters - pulse default speed deceleration time (ms)], as follows:

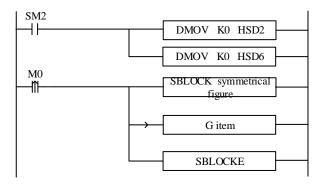


Y0 axis settings (2)

PLC1 - Pulse Set					
Config 🝷 Delete 🛛 init axis 🔷 config guide					
Param SFD1036	Value	^			
Y1 axis-Common-Parameters setting-Pulse direction logic	positive logic				
Y1 axis-Common-Parameters setting-enable soft limit	disable				
Y1 axis-Common-Parameters setting-mechanical back to	negative				
Y1 axis-Common-Parameters setting Motor operating mo	Position Mode				
V1 axis-Common-Parameters setting-Pulse unit pulse number					
Y1 axis-Common-Parameters setting-Interpolation coor	Cross coordi				
¥1 axis-Common-pulse send mode	complete mode				
V1 axis-Common-Pulse num (1)	1				
V1 axis-Common-Offset (1)	1				
V1 axis-Common-Pulse direction terminal	¥5				
¥1 axis-Common-Delayed time of pulse direction (ms)	10	v			
Read From PLC Write To PLC OK	Cancel				

Y1 axis settings (1)

After setting up, click OK and write a complete program in the ladder diagram. As shown in the following figure, write the set value in the relevant register. When M0 is turned on once, execute BLOCK once, and walk the figure in this example once.



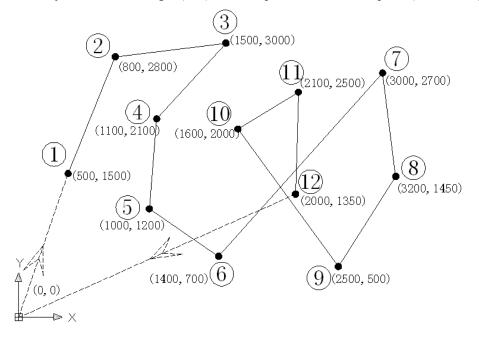
Note:

(1) The current position pulses of the two axes can be monitored by HSD2 (double word) and HSD4 (double word).

(2) The output terminals of the two axes correspond to Y0 and Y1 respectively, while the output terminals of the direction correspond to Y4 and Y5 respectively.

2-6-4. Disorder line segments

As shown in the figure, in the plane consisting of X-axis and Y-axis, the positioning of the equipment starts from the origin (0, 0), moves rapidly in the order of digital labeling (1-12) in the figure, and finally returns to the origin (0, 0) from the position of the 12th point (2000, 1350).



Note:

In this example, as the coordinates of each point are disorderly, so the lines connected sequentially by each point are slopes of arbitrary slope, so they can only be realized by the function of linear interpolation. From the graphics in the example, the coordinates of each point have been determined, so it is easier to choose absolute mode than relative mode.

The two axes are designated Y0 (X axis) and Y1 (Y axis), the corresponding direction terminals are Y4 and Y5, the default speed is 1000Hz, the acceleration and deceleration time is 50ms, and all coordinate points are in absolute mode. Therefore, the specific parameters are set as follows:

Doint	X axis	X axis setting	Y axis	Y axis setting
Point	address	value(absolute)	address	value(absolute)
Point 1	HD0	500	HD2	1500
Point 2	HD4	800	HD6	2800
Point 3	HD8	1500	HD10	3000
Point 4	HD12	1100	HD14	2100
Point 5	HD16	1000	HD18	1200
Point 6	HD20	1400	HD22	700
Point 7	HD24	3000	HD26	2700
Point 8	HD28	3200	HD30	1450
Point 9	HD32	2500	HD34	500
Point 10	HD36	1600	HD38	2000
Point 11	HD40	2100	HD42	2500

Point 12	HD44	2000	HD46	1350
Default sp	eed (Hz)	z) 1000		
Acc/dec t	ime (ms)	ne (ms) 50		
Х	axis	Y0-p	ulse; Y4-di	rection
Y	axis	Y1-p	ulse; Y5-di	rection

Program (absolute mode):

Because the graphics are mainly composed of straight lines, the "LIN line" instruction is chosen here. Insert G instruction into BLOCK and write 12 interpolation instructions, as shown in the following figure:

		Edit Seq	uence Block 1	>
Comment: S	equence Block	1		
Insert + E	dit Delete	Upwards Downw	vards	
Index	Skip	Comment	Output	^
1		line	LIN HDO HD2 YO Y1	
2		line	LIN HD4 HD6 YO Y1	
3		line	LIN HDS HD10 YO Y1	
4		line	LIN HD12 HD14 YO Y1	
5		line	LIN HD16 HD18 VO V1	
6		line	LIN HD20 HD22 YO Y1	

Instruction (1) \sim (6)

		Edit Seq	uence Block 1	
Comment:	Sequence Block1			
		Jpwards Downw		
Index	Skip	Comment	Output	^
7		line	LIN HD24 HD26 YO Y1	
8		line	LIN HD28 HD30 Y0 Y1	
9		line	LIN HD32 HD34 YO Y1	
10		line	LIN HD36 HD38 YO Y1	
11		line	LIN HD40 HD42 YO Y1	
		line	LIN HD44 HD46 YO Y1	

Instruction $(7) \sim (12)$

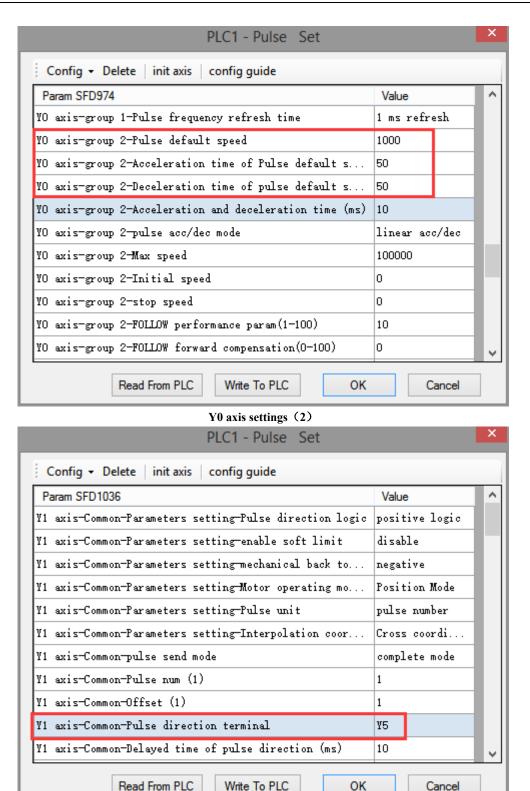
The endpoint position of all the above instructions must be set to "absolute mode", as shown in the following figure:

	G Instruct	tion	×
Skip	Comment: ine		
LIN line			~
	Params	Register	Absolute
	final position	НОО	Absolute
•	final position	HD2	Absolute
	axis 1	УО	params
	axis 2	¥1	params
		ОК	Cancel

Double-click the "parameters" to configure the parameters of Y0 and Y1 axis [pulse direction terminal], [group 2 parameters - pulse default speed (Hz)], [group 2 parameters - pulse default speed acceleration time (ms)], [group 2 parameters - pulse default speed deceleration time (ms)], as follows:

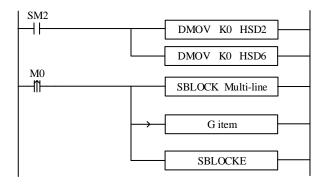
PLC1 - Pulse Set		×
Config 👻 Delete init axis config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
YO axis-Common-Parameters setting-Pulse unit	pulse number	
YO axis-Common-Parameters setting-Interpolation coor Cross coordi		
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-Offset (1)	1	
YO axis-Common-Pulse direction terminal	¥4	
YO axis-Common-Delayed time of pulse direction (ms) 10		
Read From PLC Write To PLC OK	Cancel	

Y0 axis settings (1)



Y1 axis settings (1)

After setting up, click OK and write a complete program in the ladder diagram. As shown in the following figure, write the set value in the relevant register. When M0 is turned on once, execute BLOCK once, and walk the figure in this example once.



Note:

When there are many points to go (if there are 1000 points), the ladder chart we write according to the above method will be very long, which is not conducive to the optimization of the program; therefore, we can implement multiple linear interpolation instructions by modifying the values in the linear interpolation register to improve the readability, optimize and reduce the scanning cycle of the program. For example, the user can set the coordinates of each point in the power-off retentive register through the HMI, as shown in the following table:

Point	X axis register	X axis setting value	Y axis register	Y axis setting value
Point 1	D4000	500	D4100	1500
Point 2	D4002	800	D4102	2800
Point 3	D4004	1500	D4104	300
Point 4	D4006	1100	D4106	2100
Point 5	D4008	1000	D4108	200
Point 6	D4010	1400	D4110	700
Point 7	D4012	3000	D4112	2700
Point 8	D4014	3200	D4114	1450
Point 9	D4016	2500	D4116	500
Point 10	D4018	1600	D4118	2000
Point 11	D4020	2100	D4120	2500
Point 12	D4022	2000	D4122	1350

Note: HMI register setting value (can be set by HMI recipe function).

3 Application examples

In this chapter, some main instructions with more usage are introduced in depth in the form of program examples. These programs focus on pulse output instructions and motion control instructions.

3-1. Application of pulse output

Example: Now we are going to send three consecutive pulses, the pulse terminal is Y0 and the pulse direction terminal is Y2. The pulse frequency, pulse number and acceleration and deceleration of each segment are shown in the table below.

Pulse	Frequency setting value (Hz)	Pulse number setting value	
Segment 1	3000	1000	
Segment 2	800	2000	
Segment 3	6000	8000	
Acc/dec time	Frequency changes 1000Hz every 100ms		

Address	Notes	Value	
HD0	Pulse total segments (1 to 100)	3	
(double word)		5	
HD2 (8 words)	Reserved	0	
HD10	Pulse frequency (#1)	3000	
(double words)	ruise nequency (#1)	3000	
HD12 (double	Pulse number (#1)	1000	
word)		1000	
	bit15~bit8: waiting condition (#1)		
	H00: pulse sending completion		
	H01: wait time		
	H02: wait signal		
HD14	H03: ACT time	0	
11014	H04: EXT signal	0	
	H05: EXT signal or pulse sending completion		
	bit7~bit0: waiting condition register type		
	H00: constant		
	H01: D		

Pulse data address assignment is as follows:

	1	
	H02: HD	
	H03: FD	
	H04: X	
	H05: M	
	H06: HM	
HD15	Constant value/ register no. (for waiting condition)(#1)	0
(double word)	Constant value/ register no. (for waiting condition)(#1)	0
	bit7~bit0: jump register type	
	H00: constant value	
HD17	H01: D	0
	H02: HD	
	H03: FD	
HD+18	Constant value/acciston no. (for inverse secietar)(#1)	0
(double word)	Constant value/register no. (for jump register)(#1)	0
HD+20	Dulas for success (#2)	800
(double word)	Pulse frequency (#2)	800
HD+22	Pulse number (#2)	2000
(double word)		
HD+24	Waiting condition, waiting condition register type (#2)	0
HD+25	Constant value or register no. (for waiting condition) (#2)	0
(double word)	Constant value or register no. (for waiting condition) (#2)	0
HD+27	Jump type, jump register type (#2)	0
HD+28	Constant value or register no. (for jump register) (#2)	0
(double word)	Constant value of register no. (for jump register) (#2)	0
HD+30	Pulse frequency (#2)	6000
(double word)	Pulse frequency (#3)	0000
HD+32	Pulse number (#2)	8000
(double word)	Pulse number (#3)	8000
HD+34	Waiting condition, waiting condition register type (#3)	0
HD+35	Constant value on magistar no. (for secitive or divise) (1/2)	0
(double word)	Constant value or register no. (for waiting condition) (#3)	0
HD+37	Jump type, jump register type (for waiting condition) (#3)	0
HD+38	Constant value or register no. (for jump register) (#3)	0
(double word)	Constant value of register no. (for jump register) (#5)	V

System parameters

SFD900Pulse parameter setting0: positive logic 1: negative logic, default is 0 Bit 2: use soft limit function 0: not use 1: use default is 0 Bit 3: mechanical return to origin direction 0: negative direction 1: positive direction default is 0 Bit 0: pulse number 1: equivalent 000: pulse number 1: equivalent 000: pulse number 1: oolige number 001: 1 um 011: 0.01mm 111: 1 mm Default is 0000SFD901Pulse sending modeBit 0: pulse sending mode 0: complete mode 1: subsequence mode, default is 00SFD902Pulse number/1 rotation low 16 bitsBit 0: pulse sending mode 0: complete mode 1: subsequence mode, default is 00SFD903Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD905Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD905Pulse number/1 rotation nigh 16 bitsComplete Complete mode 1: subsequence mode, default is 00SFD906Pulse direction terminal (Gear clearance positive compensationY terminal no., 0xFF is no terminal 22SFD906Gear clearance negative compensationCompensation0SFD907Direction delay time compensationCompensation <t< th=""><th></th><th></th><th></th><th></th><th></th></t<>					
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SFD900Pulse parameter settingdirection 0: negative direction 1: positive direction default is 0 Bit 10-8: pulse number 1: equivalent 000: pulse number 001: 1 um 011: 0.01mm 111: 1 nm Default is 00 Bit15: interpolation coordinate mode 0: cross coordinate 1: polar coordinate Default is 00SFD901Pulse sending mode 16 bitsBit 0: pulse sending mode 0: cross coordinate 1: subsequence mode, default is 00SFD902Pulse number/1 rotation low 16 bitsBit 0: pulse sending mode 0: cross coordinate 1: subsequence mode, default is 00SFD903Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD905Pulse number/1 rotation 16 bitsComplete mode 1: subsequence 16 bits0SFD906Pulse number/1 rotation 16 bitsDefault is 20, unit: ms2SFD907Direction delay time compensationDefault is 20, unit: ms2SFD908Gear clearance positive compensationComplete mode 1: subsequence positive<					met
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SFD900Pulse parameter settingdirection default is 0 Bit 10-8: pulse unit Bit 0-9: pulse unit Bit 000: pulse number 001: 1 um 011: 0.01mm 101: 0.1mm 111: 1 mm Default is 0000SFD901Pulse sending modeDirection coordinate is 0 0: cross coordinate 1: polar coordinate Default is 00SFD902Pulse number/1 rotation low 16 bitsBit 0: pulse sending mode 0: cross coordinate 1: subsequence mode, default is 00SFD903Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Motion quantity/1 rotation low 16 bits00SFD905Motion quantity/1 rotation low 16 bits00SFD906Pulse circetion terminal compensationY terminal no., 0xFF is no terminal 2 02SFD908Gear clearance positive compensationDefault is 20, unit: ms0SFD909Gear clearance negative compensation00SFD900Electrical origin low 16 bits00					
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Bit8: 0: pulse number 1: equivalent 000: pulse number 001: 1 um 011: 0.01mm 101: 0.1mm 101: 0.1mm 101: 0.1mm 101: 0.1mm 111: 1 mm Default is 000 Bit15: interpolation coordinate mode 0: cross coordinate 1: polar coordinate Default is 0SFD901Pulse sending mode 0: complete mode 1: subsequence mode, default is 00SFD902Pulse number/1 rotation low 16 bitsEffection terminal 0: complete mode 1: subsequence mode, default is 00SFD903Pulse number/1 rotation low 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Motion quantity/1 rotation low 16 bits00SFD905Motion quantity/1 rotation high 16 bits00SFD906Pulse direction terminal of 16 bits2SFD907Direction delay time compensationDefault is 20, unit: ms20SFD908Gear clearance positive compensation00SFD909Electrical origin low 16 bits00	SFD900	Pulse parameter setting	-	0	
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SFD909compensation0SFD910Electrical origin low 16 bits0					
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	SFD910	-		0	
SFD911 Electrical origin high 16 bits 0	SFD911	Electrical origin high 16 bits		0	

	1	[1	1
		Bit0: origin signal switch state		
		Bit1: Z phase switch state		
		Bit2: positive limit switch state		
SFD912	Signal terminal state setting	Bit3: negative limit switch state	0	
		0: normally open(positive logic)		
		1: normally close(negative logic)		
		default is 0		
SFD913	Class point signal	Bit0~bit7: set X terminal, 0xFF is no	0xFF	
560915	Close point signal	terminal(interruption)	UXFF	
SFD914	7 phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no	0xFF	
560914	Z phase terminal setting	terminal(interruption)	UXFF	
		Bit7~bit0: X terminal of positive		
SFD915		limit, 0xFF is no terminal	PPPP	
SFD915	Limit terminal setting	Bit15~bit8: X terminal of negative	FFFF	
		limit, 0xFF is no terminal		
CED017	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no	0 EE	
SFD917	terminal	terminal	0xFF	
00010	Returning speed VH low 16		0	
SFD918	bits		0	
00010	Returning speed VH high 16		0	
SFD919	bits		0	
GED022	Crawling speed VC low 16		0	
SFD922	bits		0	
SED022	Crawling speed VC high 16		0	
SFD923	bits		0	
SFD924	Mechanical origin position		0	
5FD924	low 16 bits		0	
CED025	Mechanical origin position		0	
SFD925	high 16 bits		0	
SFD926	Z phase numbers		0	
SFD927	CLR signal delay time	Default 20, unit: ms	20	
SFD928	Grinding wheel radius(polar	Low 16 bits	0	
SFD929	coordinate)	High 16 bits	0	
SFD930		Low 16 bits	0	
SFD931	Soft limit positive limit value	High 16 bits	0	1
SFD932	Soft limit negative limit	Low 16 bits	0	1
SFD933	value	High 16 bits	0	1
•••				
0.000 0.000	Pulse default speed low 16		1005	G
SFD950	bits		1000	Group 1
	Pulse default speed high 16	It will send pulse with default speed	_	p 1
SFD951	bits	when the speed is 0.	0	
		the speed to o.		

SFD952	Pulse default speed		100	
	acceleration time			
SFD953	Pulse default speed		100	
51 2755	deceleration time		100	
SFD954	Acceleration and		0	
51 0 9 5 4	deceleration time			
		Bit 1~0: acc/dec mode		
		00: line		
SFD955	Pulse acceleration and	01: S curve		
SFD955	deceleration mode	10: sine curve		
		11: reserved		
		Bit 15~2: reserved		
SFD956	Max speed limit low 16 bits		3392	
SFD957	Max speed limit high 16 bits		3	
SFD958	Initial speed low 16 bits		0	
SFD959	Initial speed high 16 bits		0	
SFD960	Stop speed low 16 bits		0	
SFD961	Stop speed high 16 bits		0	
		$1 \sim 100$, 100 means the time constant is		
SFD962	Follow performance	one tick, 1 means the time constant is		
	parameters	100 tick.		
	Follow feedforward			
SFD963	compensation	0~100, percentage		
	1			_

Pulse instruction:

M0	PLSR	HD0	HD100	К1	YO
SM1000	RST	MO]		

Software configurations:

Pulse configuration

iode:	relative 🗸	start execute section count:	0 Config			
Add Dele	ete Upwards Do	wnwards				
	frequence	pulse count	wait condition	wait register	jump register	
1	3000	1000	pulse sending complete	KO	KO	
2	800	2000	pulse sending complete	KO	KO	
3	6000	8000	pulse sending complete	KO	KO	

Pulse system parameters

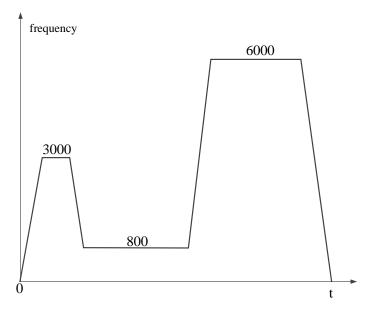
PLC1 - Pulse Set		×
Config 👻 Delete init axis config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
YO axis-Common-Parameters setting-Pulse unit	pulse number	
YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-Offset (1)	1	
YO axis-Common-Pulse direction terminal	¥2	
YO axis-Common-Delayed time of pulse direction (ms)	10	v
Read From PLC Write To PLC OK	Cancel	

Config 👻 Delete 🛛 init axis 🔤 config guide		
Param SFD906	Value	1
YO axis-Common-Gear clearance positive compensation	0	
YO axis-Common-Gear clearance negative compensation	0	ы
YO axis-Common-Electrical origin position	0	Ľ
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	Ш
YO axis-Common-signal terminal switch state setting	normally on	Ш
YO axis-Common-signal terminal switch state setting	normally on	L
YO axis-Common-Far-point signal terminal setting	X no terminal	
YO axis-Common-Z phase terminal setting	X no terminal	
YO axis-Common-positive limit terminal setting	X no terminal	
YO axis-Common-negative limit terminal setting	X no terminal	

PLC1 - Pulse Set Config - Delete | init axis | config guide ^ Param SFD924(dword) Value YO axis-Common-positive limit terminal setting X no terminal X no terminal YO axis-Common-negative limit terminal setting YO axis-Common-Zero clear CLR output setting Y no terminal YO axis-Common-Return speed VH 0 YO axis-Common-Creeping speed VC 0 YO axis-Common-Mechanical zero position 0 0 YO axis-Common-Z phase num YO axis-Common-CLR signal delayed time (ms) 20 YO axis-Common-grinding wheel radius(polar Interpola... 0 YO axis-Common-soft limit positive value 0 YO axis-Common-soft limit negative value 0 ¥ Read From PLC Write To PLC OK Cancel

Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD963	Value	1
YO axis-group 1-Pulse default speed	1000	
YO axis-group 1-Acceleration time of Pulse default s	100	
YO axis-group 1-Deceleration time of pulse default s	100	
YO axis-group 1-Acceleration and deceleration time (ms)	10	
YO axis-group 1-pulse acc/dec mode	linear acc/dec	١.
YO axis-group 1-Max speed	200000	
YO axis-group 1-Initial speed	0	E
YO axis-group 1-stop speed	0	
YO axis-group 1-FOLLOW performance param(1-100)	50	
YO axis-group 1-FOLLOW forward compensation(0-100)	0	
YO axis-group 1-Pulse frequency refresh time	1 ms refresh	

Pulse sending oscillogram



3-2. Application of motion control in arc saw machining system

1. Introduction of arc saw technology

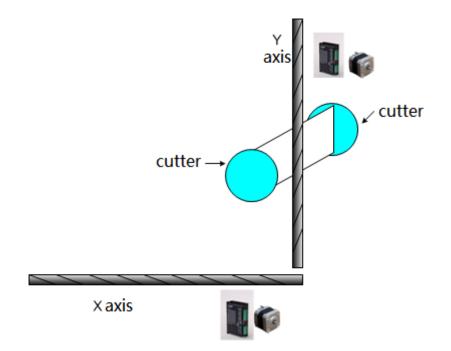
The arc saw is a machine used to cut arc boards. The mechanical characteristics are that the arc radius is large and the motor load is large.

2. Products applied in this system

Product name	Model	Number
PLC	ХDМ-32Т4-Е	1
HMI	OP320-A	1
Stepper driver	DP-21P5	2

3. Composition of control system

(1) The composition of system hardware



As shown in the figure, two stepper motors control X and Y axis respectively, and use the arc interpolation instruction of XINJE XDM PLC to make X and Y axis coordinate and get out of the circular arc track. The relative distance of the cutter installed on the workbench determines the width of the plate cut by the cutter.

(2) Technical difficulties

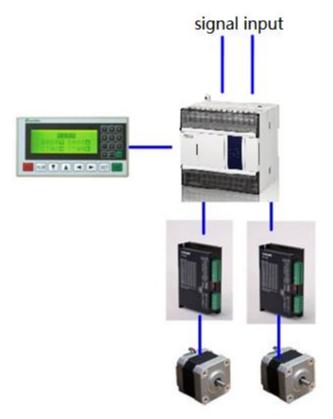
- The processing arc radius is large, the pitch of the XY axis screw is large, the number of pulse and the amount of movement are difficult to configure, if the setting is not appropriate, the data calculation is easy to overflow.
- Due to the heavy load of the motor, it is easy to lose step or overshoot.

- The speed of returning to the mechanical origin should not be too fast.
- Owing to the ellipse of the processed arc board, the ellipse can not be cut directly by arc interpolation, otherwise the board can not be sawn through.

(3) Control scheme

This scheme adopts the motion-controlled PLC XDM, which has high-speed command operation, built-in four 100KHz high-speed pulse output, support motion control command arc interpolation, RS232, RS485 serial ports, convenient for various upper computer monitoring, powerful external interrupt function, greatly saves the electrical cost for customers.

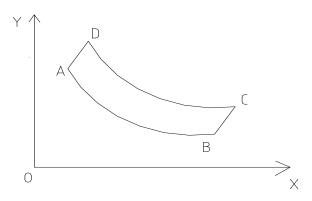
In view of the above difficulties, we adopt the method of reducing the ratio of the number of pulses and the amount of movement to reduce the calculation value and prevent the calculation overflow. (For example, the number of pulses is 2400 and the amount of movement is 10000. When setting parameters, the amount of movement is reduced by 10 times to 1000, so the number of pulses per unit is increased by 10 times. When setting physical quantities, we will reduce by 10 times accordingly. For example, when setting 1000 millimeters, we only need to set 100 in the corresponding registers.) In order to ensure that the motor is not out of step or overshoot, it is necessary to set the acceleration and deceleration time a little longer and increase the driver current (note that the motor is easy to heat if the current is too large). Before the arc interpolation, the straight line cutting is carried out, and then the arc cutting is carried out, which solves the problem that the direct arc cutting can not be cut through.



In positioning motion control, returning to mechanical origin is very important for control accuracy. However, some mechanical motors have a large load and only one origin signal. The control object is a stepper motor. There is no Z-phase signal output, and the requirement of

returning to the origin is fast. In this case, we use the ZRN instruction in XD to configure the internal acceleration and deceleration time settings. The problem has been solved.

(4) The operation diagram of the interpolation instructions in the system is as follows:



The coordinates of the points in the figure are as follows: O(HD0, HD2), A(HD4, HD6), B(HD8, HD10), C(HD12, HD14), C(HD16, HD18), the midpoint coordinates of the AB arc are (HD20, HD22), the midpoint coordinates of the CD arc are (HD24, HD26). Motion path: $O \rightarrow A \rightarrow B \rightarrow C \rightarrow D \rightarrow A \rightarrow O$.

5. The interpolation instructions in the system are as follows:

Insert + Edi	t Delete Up	wards Downward	s
Index	Skip	Comment	Output
1	OA	fast position	DRV HD4 HD6 YO Y1
2	AB	three point	ARC HD8 HD10 HD20 HD22 Y0 Y1
3	BC	line	LIN HD12 HD14 YO Y1
4	CD	three point	ARC HD16 HD18 HD24 HD26 YO Y1
5	DA	line	LIN HD4 HD6 YO Y1
6	AO	fast position	DRV HDO HD2 YO Y1

3-3. Application of motion control in hair planting machine

1. Process introduction

At present, the electric control system structure of hair planting machine is mainly divided into single chip computer control system or CNC numerical control system. Among them, the single-chip computer control system is based on the integrated service of automation system manufacturer, supplemented by the independent research and development of toothbrush equipment manufacturer.

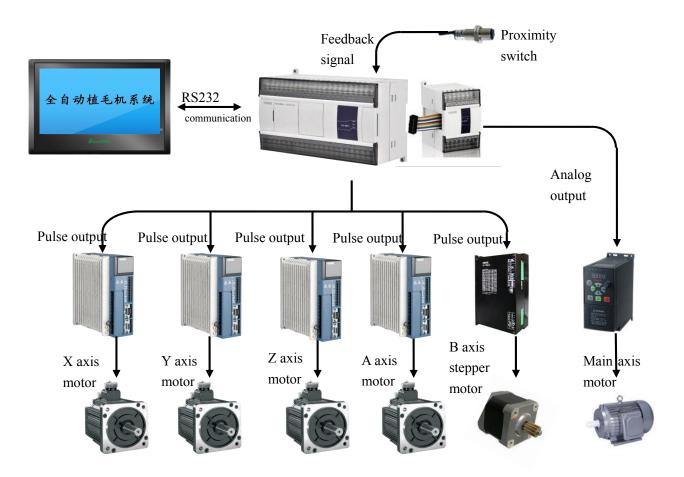
The drive structure of high-speed toothbrush hair planter is composed of main drive shaft and four servo drive shaft systems. The four servo axes are horizontal X-axis, vertical Y-axis, hair changing Z-axis and rotary A-axis. The position of the toothbrush hole is determined by the coordinates of the XY two axes. The A axis play the role of replacing the next toothbrush and the Z axis play the role of replacing the brush color. When the main shaft motor (frequency converter control) runs, the four electronically controlled servo shafts will run, while the other four shafts will stop when the main shaft stops. The speed of the main axis determines the speed of hair planting. The response of the four servo shafts need coordinated driving, otherwise, hair removal or hair irregularity will occur.

Product name	Model	Quantity
PLC	XDM-60T4-E	1
Extension module	XD-E2DA	1
HMI	TG865-MT (U)	1
Servo drive	DS3-20P7-PQA	3
Servo drive	DS3-20P4-PQA	1

2. the products required in the application

3. Composition of Control System

(1) The Composition of System Hardware



(2) Finished toothbrush products



(3) Technological difficulties

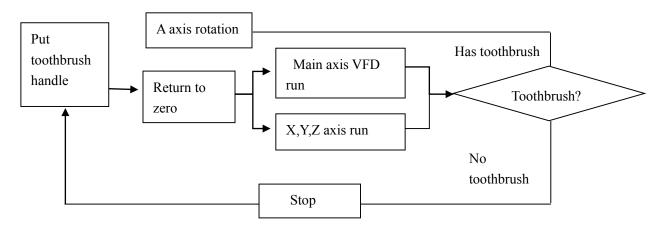
The difficulty of developing servo solution is the joint debugging of electromechanical system, in which the adjustment of servo gain and the cooperation of PLC triangular function curve are the main problems. Among the four servo shafts, the mechanical inertia of X-axis and Y-axis is relatively stable due to the screw drive structure, and it is easy to debug, so it is possible to modify the speed gain. The Z-axis of the turning plate is a rotating axis. There is centrifugal force in high-speed rotation. If the gain of the turning plate is set very high, the motor will vibrate when it starts and stops. At this time, the position filtering time parameters can be modified to eliminate

the vibration. Comparatively speaking, the structure of cam mechanism for changing hair U-axis makes debugging more difficult. In addition, the mechanical rigidity of U-axis is not good. When the motor runs, the inertia ratio varies greatly, the output current of the motor varies greatly, and the parameters can not be adjusted properly. When the motor runs around, the shaft either vibrates or screams, or reacts slowly. When the parameters are adjusted, the gain of the speed loop and the filtering time parameters and position loop gain need to be adjusted accordingly.

(4) Control solution

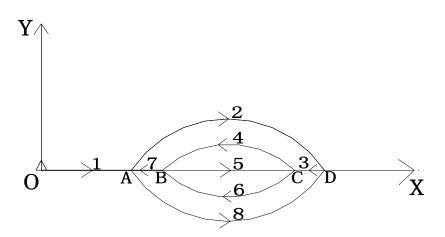
Mainly control axis pulse command signal to achieve servo drive, usually four-axis control output. The motion control type of PLC XDM-60T4-E is chosen. It has a response speed of 0.1ms and four high-speed pulses, which can realize the two-axis interpolation operation required by the toothbrush hair planter. The four sets of servo drivers are DS3 series AC servo system with power of 400W~750W. The driver has many functions, such as strong overload ability, strong anti-load disturbance ability, large starting moment, high dynamic response speed and short positioning time. The main axis motor frequency converter model is Xinje VB5N series, the power is 400 W.

(5) action order



Action process: The clip holds the toothbrush handle from Y axis direction \rightarrow 90 degrees positioning to Z axis direction \rightarrow platform drives the clip to do X Y axis movement enables the brush hair to be hit into the hole of the toothbrush head \rightarrow hair planting completes, the clip rotates downward 90 degrees \rightarrow the clip loosens, and a toothbrush is produced. The application of Xinje XDM series PLC and DS5 servo system can achieve 900 times/minute hair planting speed. And at the same time of high-speed start and stop, the stability and softness of the overall movement is particularly prominent. Through the application of self-made pulse S curve in PLC, we can achieve hole skipping hair planting. When skipping, the machine is almost as smooth as usual without obvious jitter while ensuring the accuracy of skipping.

4. The operation diagram of the interpolation instructions in the system is as follows.



The coordinates of the points in the figure are as follows: O (HD0, HD2), A (HD4, HD6), B (HD8, HD10), C (HD12, HD14), D (HD16, HD18), the midpoint coordinates of the clockwise arc of AD segment (HD20, HD22), the midpoint coordinates of the anticlosewise arc of AD segment (HD32, HD34), the midpoint coordinates of the clockwise arc of BC segment (HD28, HD30), and the midpoint coordinates of the anticlockwise arc of BC segment (HD24, HD26). Path of particle: $O \rightarrow A \rightarrow D \rightarrow C \rightarrow B \rightarrow C \rightarrow B \rightarrow A \rightarrow D \rightarrow O$.

Comment:	Sequence Block 1			
Insert +	Edit Delete	Jpwards Downward	ls	
Index	Skip	Comment	Output	^
1		fast position	DRV HD4 HD6 YO Y1	
2		three point	ARC HD16 HD18 HD20 HD22 YO Y1	
3		line	LIN HD12 HD14 YO Y1	
4		three point	ARC HD8 HD10 HD24 HD26 Y0 Y1	
5		line	LIN HD12 HD14 YO Y1	
6		three point	ARC HD8 HD10 HD28 HD30 Y0 Y1	
7		line	LIN HD4 HD6 YO Y1	
8		three point	ARC HD16 HD18 HD32 HD34 YO Y1	- v
				cel

5. The interpolation instructions in the system.

		Luit Seque	ence Block 1	
Comment: S	equence Block	1		
Insert + E	dit Delete	Upwards Downwar	ds	
Index	Skip	Comment	Output	^
2		three point	ARC HD16 HD18 HD20 HD22 YO Y1	
3		line	LIN HD12 HD14 YO Y1	
4		three point	ARC HD8 HD10 HD24 HD26 YO Y1	
5		line	LIN HD12 HD14 YO Y1	
6		three point	ARC HD8 HD10 HD28 HD30 Y0 Y1	15
7		line	LIN HD4 HD6 YO Y1	11
8		three point	ARC HD16 HD18 HD32 HD34 ¥0 ¥1	11
		line	LIN HDO HD2 YO Y1	
9				

Appendix Special soft element list

Appendix mainly introduces the functions of XD/XL series PLC special soft element, data register, FlashROM and the address distribution of expansions for users to search.

Appendix 1. Special auxiliary relay

ID	Function	Description			
SM000	Coil ON when running	RUN SM000 k	eeps ON when hing		
SM001	Coil OFF when running	SMD SM001 SM1 when PL0	keeps OFF C running		
SM002	Initial positive pulse coil	scan cycl	is ON in first e		
SM003	Initial negative pulse coil	SMB ∐ ∐ SM003 i → K— SM003 i scan cycle scan cycl	s OFF in first e		
SM004	PLC running error	When SM4 sets ON, it indicates that there the operation of PLC. (Firmware version V3.4.5 and above support by PLC)			
SM005	Battery low alarm coil	When the battery voltage is less than 2.5V, SM5 will put ON (at this time, please replace the battery as soon as possible, otherwise the data will not be maintained)			
SM007	Power-off memory data error				

Initial Status (SM0-SM7)

Clock (SM11-SM14)

ID	Function	Description
SM011	10ms frequency cycle	K 5ms X
SM012	100ms frequency cycle	$^{\underline{50ms}}_{\underline{50ms}}$
SM013	ls frequency cycle	$ \begin{array}{c} $
SM014	1min frequency cycle	$ \begin{array}{c} $

Mark (SM20-SM22)

ID	Function	Description	
SM020	Zero bit	SM020 is ON when plus/minus operation result is 0	
SM021	Borrow bit	SM021 is ON when minus operation overflows	
SM022	Carry bit	SM022 is ON when plus operation overflows	

PC Mode (SM32-SM34)

ID	Function	Description
SM032	Retentive register	When SM032 is ON, ON/OFF mapping memory of HM, HS
510052	reset	and current values of HT, HC, HD will be reset.
SM033	Clear user's program	When SM033 is ON, all PLC user's program will be cleared.
SM034	All output forbidden	When SM034 is ON, all PLC external contacts will be set

OFF.			OFF.
------	--	--	------

Stepping Ladder

ID	Function	Description	
SM040	The process is running	Set ON when the process is running	

Interruption ban (SM50-SM90)

ID	Address	Function	Description
SM050	I0000/I0001	Forbid input interruption 0	
SM051	I0100/I0101	Forbid input interruption 1	After executing EI instruction,
SM052	I0200/I0201	Forbid input interruption 2	the input interruption couldn't act independently when M acts,
SM053	I0300/I0301	Forbid input interruption 3	even if the interruption is
SM054	I0400/I0401	Forbid input interruption 4	allowed. E.g.: when SM050 is ON,
			I0000/I0001 is forbidden.
SM069	I1900/I1901	Forbid input interruption 19	
SM070	I40**	Forbid timing interruption 0	
SM071	I41**	Forbid timing interruption 1	After executing EI instruction,
SM072	I42**	Forbid timing interruption 2	the timing interruption couldn't act independently when M acts,
SM073	I43**	Forbid timing interruption 3	even if the interruption is
SM074	I44**	Forbid timing interruption 4	allowed.
SM089	I59**	Forbid timing interruption 19	
SM090		Forbid all interruptions	Forbid all interruptions

High Speed Ring Counter (SM99)

address	Function	Note
		SM99 set ON, SD99 add one
SM099	High Speed Ring Counting enable	per 0.1ms, cycle between 0 and
		32767

Address	Function	Note
SM100	HSC0 count complete flag (100 segments)	
SM101	HSC2 count complete flag (100 segments)	
SM102	HSC4 count complete flag (100 segments)	
SM103	HSC6 count complete flag (100 segments)	
SM104	HSC8 count complete flag (100 segments)	
SM105	HSC10 count complete flag (100 segments)	
SM106	HSC12 count complete flag (100 segments)	
SM107	HSC14 count complete flag (100 segments)	
SM108	HSC16 count complete flag (100 segments)	
SM109	HSC18 count complete flag (100 segments)	

High speed count complete (SM100-SM109)

High speed counter direction (SM110-SM119)

Address	Function	Note
SM110	HSC0 direction flag	
SM111	HSC2 direction flag	
SM112	HSC4 direction flag	
SM113	HSC6 direction flag	
SM114	HSC8 direction flag	
SM115	HSC10 direction flag	
SM116	HSC12 direction flag	
SM117	HSC14 direction flag	
SM118	HSC16 direction flag	
SM119	HSC18 direction flag	

High speed counter error (SM120-SM129)

address	Function	Note
SM120	HSC0 error flag	
SM121	HSC2 error flag	
SM122	HSC4 error flag	
SM123	HSC6 error flag	
SM124	HSC8 error flag	
SM125	HSC10 error flag	
SM126	HSC12 error flag	
SM127	HSC14 error flag	
SM128	HSC16 error flag	
SM129	HSC18 error flag	

Communication	(SM140-SM193)
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	Address	Function	Note
Serial	SM140	Modbus instruction execution flag	When the instruction starts to
port 0			execute, set ON
			When execution is complete, set
			OFF
	SM141	X-NET instruction execution flag	When the instruction starts to
			execute, set ON
			When execution is complete, set
			OFF
	SM142	Free format communication	When the instruction starts to
		sending flag	execute, set ON
			When execution is complete, set
			OFF
	SM143	Free format communication	When receiving a frame of data or
		receive complete flag	receiving data timeout, set ON.
			Require user program to set OFF
Serial	SM150	Modbus instruction execution flag	Same to SM140
port 1	SM151	X-NET instruction execution flag	Same to SM141
	SM152	Free format communication	Same to SM142
		sending flag	
	SM153	Free format communication	Same to SM143
		receive complete flag	
	SM160	Modbus instruction execution flag	Same to SM140
Serial	SM161	X-NET instruction execution flag	Same to SM141
port 2	SM162	Free format communication	Same to SM142
		sending flag	
	SM163	Free format communication	Same to SM143
		receive complete flag	
Serial	SM170	Modbus instruction execution flag	Same to SM140
port 3	SM171	X-NET instruction execution flag	Same to SM141
	SM172	Free format communication	Same to SM142
		sending flag	
	SM173	Free format communication	Same to SM143
		receive complete flag	
Serial	SM180	Modbus instruction execution flag	Same to SM140
port 4	SM181	X-NET instruction execution flag	Same to SM141
	SM182	Free format communication	Same to SM142
		sending flag	
	SM183	Free format communication	Same to SM143
		receive complete flag	
Serial	SM190	Modbus instruction execution flag	Same to SM140

port 5	SM191	X-NET instruction execution flag Same to SM141
	SM192	Free format communication Same to SM142
		sending flag
	SM193	Free format communication Same to SM143
		receive complete flag

Sequence Function BLOCK (SM240-SM349)

ID	Function	Description
SM300	BLOCK1 running flag	SM300 will be ON when block1 is running
SM301	BLOCK2 running flag	SM301 will be ON when block2 is running
SM302	BLOCK3 running flag	SM302 will be ON when block3 is running
SM303	BLOCK4 running flag	SM303 will be ON when block4 is running
SM304	BLOCK5 running flag	SM304 will be ON when block5 is running
SM305	BLOCK6 running flag	SM305 will be ON when block6 is running
SM346	BLOCK47 running flag	SM346 will be ON when block47is running
SM347	BLOCK48 running flag	SM347 will be ON when block48 is running
SM348	BLOCK49 running flag	SM348 will be ON when block49 is running
SM349	BLOCK50 running flag	SM349 will be ON when block50 is running

Error check (SM400-SM413)

ID	Function	Description
		ERR LED keeps ON, PLC don not run and output, check when
SM400	I/O error	power on
	Expansion module	
SM401	communication error	
	BD communication	
SM402	error	
SM405	No user program	Internal code check wrong
SM406	User program error	Implement code or configuration table check wrong
		ERR LED keeps ON, PLC don not run and output, check when
SM407	SSFD check error	power on
SM408	Memory error	Can not erase or write Flash
SM409	Calculation error	
SM410	Offset overflow	Offset exceeds soft element range
SM411	FOR-NEXT	Reset when power on or users can also reset by hand.

	overflow	
		When offset of register overflows, the return value will be
SM412	Invalid data fill	SM372 value

Error Message (SM450-SM452)

ID	Function	Description
SM450	System error check	
SM451	Hardfault interrupt flag	
SM452		
SM453	SD card error	
SM454	Power supply is cut off	
SM460	Extension module ID not match	
SM461	BD/ED module ID not match	
SM462	Extension module communication overtime	
SM463	BD/ED module communication overtime	

Expansion Modules, BD Status (SM500)

ID	Function	Description
SM500	Module status read is finished	

High speed pulse (SM1000-SM1190)

ID	Function	Explanation	Output point
SM1000	Pulse sending flag	ON: Pulse is sending	
		1 is positive direction, related direction	
SM1001	Direction flag	signal is ON	
	Accumulated pulse		
SM1002	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1003	equivalent overflow flag	1 is overflow	Y0
SM1004			
SM1005			
SM1006			
SM1007			
SM1008			
SM1009			

SM1010	Pulse error flag	ON: error	
SM1020	Pulse sending flag	ON: Pulse is sending	
5111020		1 is positive direction, related direction	
SM1021	Direction flag	signal is ON	
	Accumulated pulse		
SM1022	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1023	equivalent overflow flag	1 is overflow	
SM1024			Y1
SM1025			
SM1026			
SM1027			
SM1028			
SM1029			
SM1030	Pulse error flag	ON: error	
SM1040	Pulse sending flag	ON: Pulse is sending	
		1 is positive direction, related direction	
SM1041	Direction flag	signal is ON	
	Accumulated pulse	6	
SM1042	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1043	equivalent overflow flag	1 is overflow	
SM1044			Y2
SM1045			
SM1046			
SM1047			
SM1048			
SM1049			
SM1050	Pulse error flag	ON: error	
SM1060	Pulse sending flag	ON: Pulse is sending	
		1 is positive direction, related direction	
SM1061	Direction flag	signal is ON	
	Accumulated pulse		
SM1062	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1063	equivalent overflow flag	1 is overflow	X2
SM1064			Y3
SM1065			
SM1066			
SM1067			
SM1068			
SM1069			
SM1070	Pulse error flag	ON: error	

SM1080	Pulse sending flag	ON: Pulse is sending	
21111000	and benaning mug	1 is positive direction, related direction	
SM1081	Direction flag	signal is ON	
51411001	Accumulated pulse		
SM1082	number overflow flag	1 is overflow	
5111002	Accumulated pulse		
SM1083	equivalent overflow flag	1 is overflow	
SM1083	equivalent overnow hag	1 is overnow	Y4
SM1085			
SM1086			
SM1087			
SM1088			
SM1089			
SM1090	Pulse error flag	ON: error	
SM1100	Pulse sending flag	ON: Pulse is sending	
		1 is positive direction, related direction	
SM1101	Direction flag	signal is ON	
	Accumulated pulse		
SM1102	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1103	equivalent overflow flag	1 is overflow	Y5
SM1104			15
SM1105			
SM1106			
SM1107			
SM1108			
SM1109			
M1110	Pulse error flag	ON: error	
SM1120	Pulse sending flag	ON: Pulse is sending	
		1 is positive direction, related direction	
SM1121	Direction flag	signal is ON	
	Accumulated pulse		
SM1122	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1123	equivalent overflow flag	1 is overflow	17
SM1124			Y6
SM1125			
SM1126			
SM1127			
SM1128			
SM1129			
SM1129	Pulse error flag	ON: error	
SM1140	Pulse sending flag	ON: Pulse is sending	Y7

SM1141Direction flag1 is positive direction, related directionSM1141Direction flagsignal is ONAccumulatedpulseSM1142number overflow flag1 is overflowAccumulatedpulseSM1143equivalent overflow flag1 is overflowSM1144ISM1144SM1145SM1146I	
AccumulatedpulseSM1142number overflow flag1 is overflowAccumulatedpulseSM1143equivalent overflow flag1 is overflowSM1144SM1144SM1145	
SM1142 number overflow flag 1 is overflow Accumulated pulse SM1143 equivalent overflow flag 1 is overflow SM1144 SM1144	
Accumulated pulse SM1143 equivalent overflow flag 1 is overflow SM1144 SM1145 SM1145	
SM1143 equivalent overflow flag 1 is overflow SM1144	
SM1144 SM1145	
SM1145	
SW1140	
SM1147	
SM1148 SM1149	
SM1150 Pulse error flag ON: error SM1160 Pulse conding flag ON: Pulse is conding	
SM1160 Pulse sending flag ON: Pulse is sending 1 is positive direction related direction	
SM1161 Direction flag 1 is positive direction, related direction	
Accumulated pulse SM1162 number overflow flag 1 is overflow	
Accumulated pulse	
SM1163 equivalent overflow flag 1 is overflow	
SM1163 equivalent overhow hag in soverhow Y1 SM1164 Y1	.0
SM1104	
SM1165	
SM1160	
SM1167	
SM1109	
SM1109 SM1170 Pulse error flag ON: error	
SM1170 Pulse ending flag ON: Pulse is sending	
I use sending mag Orth rule is sending 1 is positive direction, related direction	
SM1181 Direction flag signal is ON	
Accumulated pulse	
SM1182 number overflow flag 1 is overflow	
Accumulated pulse	
SM1183 equivalent overflow flag 1 is overflow	
SM1184 Y1	.1
SM1185	
SM1186	
SM1187	
SM1188	
SM1189	
SM1190 Pulse error flag ON: error	

Appendix 2. Special data reigster list

Battery (SD5~SD7)

ID	Function	Description
SD005	Battery register	It will display 100 when the battery voltage is 3V, if the battery voltaeg is lower than 2.5V, it will display 0, it means please change new battery at once, otherwise the data will lose when PLC power off.
SD007	Power-off memory data error type	

Clock (SD10-SD019)

ID	Function	Description
SD010	Current scan cycle	100us, us is the unit
SD011	Min scan time	100us, us is the unit
SD012	Max scan time	100us, us is the unit
SD013	Second (clock)	0~59 (BCD code)
SD014	Minute (clock)	0~59 (BCD code)
SD015	Hour (clock)	0~23 (BCD code)
SD016	Day (clock)	0~31 (BCD code)
SD017	Month (clock)	0~12 (BCD code)
SD018	Year (clock)	2000~2099 (BCD code)
SD019	Week (clock)	0(Sunday)~6(Saturday)(BCD code)

Flag (SD020-SD031)

ID	Function	Note
SD020	Model type	
SD021	model (low-8) series (high-8)	
SD022	Compatiable system version (low) system version (high)	
SD023	Compatiable model version (low) model version (high)	
SD024	Model info	
SD025	Model info	
SD026	Model info	
SD027	Model info	
SD028	Suitable software version	
SD029	Suitable software version	
SD030	Suitable software version	
SD031	Suitable software version	

Step ladder (SD040)

ID	Function	Description
SD40	Flag of the executing process S	

High Speed Counting (SD100-SD109)

ID	Function	Description	
SD100	Current segment (No. n segment)		HSC00
SD101	Current segment (No. n segment)		HSC02
SD102	Current segment (No. n segment)		HSC04
SD103	Current segment (No. n segment)		HSC06
SD104	Current segment (No. n segment)		HSC08
SD105	Current segment (No. n segment)		HSC10
SD106	Current segment (No. n segment)		HSC12
SD107	Current segment (No. n segment)		HSC14
SD108	Current segment (No. n segment)		HSC16
SD109	Current segment (No. n segment)		HSC18

High speed counter error (SD120-SD129)

ID	Function	Note	
SD120	HSC0 error info		
SD121	HSC2 error info		
SD122	HSC4 error info		
SD123	HSC6 error info		
SD124	HSC8 error info		
SD125	HSC10 error info		
SD126	HSC12 error info		
SD127	HSC14 error info		
SD128	HSC16 error info		
SD129	HSC18 error info		

communication (SD140~SD199)

ID	Function	Note
SD140	Modbus read write	0: correct
	instruction execution result	100: receive error
		101: receive overtime

	1	Ι	
			180: CRC error
			181: LRC error
			182: station error
			183: send buffer overflow
			400: function code error
Serial			401: address error
port 0			402: length error
			403: data error
			404: slave station busy
			405: memory error (erase FLASH)
	SD141	X-Net communication result	0: correct
			1: communication overtime
			2: memory error
			3: receive CRC error
	SD142	Free format communication	0: correct
		send result	410: free format send buffer overflow
	SD143	Free format communication	0: correct
		receive result	410: send data length overflow
			411: receive data short
			412: receive data long
			413: receive error
			414: receive overtime
			415: no start character
			416: no end character
	SD144	Free format communication	In bytes, there are no start and stop
		receive data numbers	characters
	SD149		
	SD150	Modbus read write	0: correct
	50150	instruction execution result	100: receive error
		instruction execution result	101: receive overtime
			180: CRC error
			180: CKC choi 181: LRC error
			181. LKC error
			183: send buffer overflow
			400: function code error
			401: address error
g · 1			402: length error
Serial			403: data error
port 1			404: slave station busy
			405: memory error (erase FLASH)
	SD151	X-Net communication result	0: correct
1			1: communication overtime
			2: memory error

			3: receive CRC error
	SD152	Free format communication	0: correct
	50152	send result	410: free format send buffer overflow
	SD153	Free format communication	0: correct
	50155	receive result	
		leceive result	410: send data length overflow
			411: receive data short
			412: receive data long
			413: receive error
			414: receive overtime
			415: no start character
			416: no end character
	SD154	Free format communication	In bytes, there are no start and stop
		receive data numbers	characters
	•••••		
	SD159		
	SD160	Modbus read write	0: correct
		instruction execution result	100: receive error
			101: receive overtime
			180: CRC error
			181: LRC error
Serial			182: station error
port 2			183: send buffer overflow
			400: function code error
			401: address error
			402: length error
			403: data error
			404: slave station busy
			405: memory error (erase FLASH)
	SD161	X-Net communication result	0: correct
			1: communication overtime
			2: memory error
			3: receive CRC error
	SD162	Free format communication	0: correct
	52102	send result	410: free format send buffer overflow
	SD163	Free format communication	0: correct
	52105	receive result	410: send data length overflow
			411: receive data short
			412: receive data long
			413: receive error
			414: receive overtime
			415: no start character
			415: no end character
	SD164	Free format communication	
	50104		In bytes, there are no start and stop
		receive data numbers	characters

	•••••	
	SD169	
Serial	SD170~SD179	
port 3		
Serial	SD180~SD189	
port 4		
Serial	SD190~SD199	
port 5		

Sequence Function Block (SD300-SD399)

ID	Function Description	
SD300	Executing instruction of BLOCK1	The value will be used when BLOCK monitors
SD301	Executing instruction of BLOCK2	The value will be used when BLOCK monitors
SD302	Executing instruction of BLOCK3	The value will be used when BLOCK monitors
SD303	Executing instruction of BLOCK4	The value will be used when BLOCK monitors
SD304	4 Executing instruction of BLOCK5 The value will be used when BLOCK mon	
SD305	5 Executing instruction of BLOCK6 The value will be used when BLOCK monitor	
SD396	Executing instruction of BLOCK97	The value will be used when BLOCK monitors
SD397	Executing instruction of BLOCK98	The value will be used when BLOCK monitors
SD398	Executing instruction of BLOCK99	The value will be used when BLOCK monitors
	Executing instruction of	
SD399	BLOCK100	The value will be used when BLOCK monitors

Error Check (SD400-SD413)

ID	Function	Note
SD400		
	Extension module no. of	
SD401	communication error	Means module no.n is error
	BD/ED module no. of	
SD402	communication error	
SD403	FROM/TO error type	
SD404	PID error type	
•••••		
SD409	Calculation error code	1: divide by 0 error
		2: MRST, MSET front operand address less than back
		operand

		3: ENCO, DECO data bits of encoding and decoding instructions exceed the limit.4: BDC code error
		7: Radical sign error
SD410	The number of offset register D	
	when offset crosses the	
	boundary	
SD411		
	Invalid data fill value (low 16	
SD412	bits)	
	Invalid data fill value (high 16	
SD413	bits)	

Error Check (SD450-SD452)

ID	Function	Description
	1: Watchdog act (Default 200ms)	
	2: Control block application fail	
SD450	3: Visit illegal address	
	Hardware error type:	
	1: Register error	
	2: Bus error	
SD451	3: Usage error	
SD452	Hardware error	
SD453	SD card error	
SD454	Power-off time	
SD460	Extension module ID not match	
SD461	BD/ED module ID not match	
SD462	Extension module communication overtime	
SD463	BD/ED module communication overtime	

Expansion Modules, BD Status (SD500-SD516)

ID	Function	Description	
	Module number		
	Expansion modules: #10000 \sim		
SD500	10015		
	BD: #20000~20001		
	ED: #30000		
	Expansion module, BD /ED		
SD501~516	status		16 registers

Module info (SD520-SD823)

ID	Function	Explanation	Note
SD520~SD535	Extension module info	Extension module 1	
	•••••	•••••	Each extension
SD760~SD775	Extension module info	Extension module 16	module, BD,
SD776~SD791	BD module info	BD module 1	ED occupies
SD792~SD807	BD module info	BD module 2	16 registers
SD808~SD823	ED module info	ED module 1	

Expansion Module Error Information

ID	Function	Description	
SD860	Error times of module read		
SD861	Error types of module read	Module address error. Module accepted data length error. Module CRC parity error when PLC is accepting data. Module ID error. Module overtime error.	Expansion module 1
SD862	Error times of module write		
SD863	Error types of module write		
SD864	Error times of module read		
SD865	Error types of module read	Module address error. Module accepted data length error. Module CRC parity error when PLC is accepting data. Module ID error. Module overtime error.	Expansion module 2
SD866	Error times of module write		
SD867	Error types of module write		
SD920	Error times of module read		
SD921	Error types of module read	Module address error. Module accepted data length error. Module CRC parity error when PLC is accepting data. Module ID error. Module overtime error.	Expansion module 16
SD922	Error times of module write		

SD923	Error types of module write	
SD924	Error times of module read	
SD925	Error types of module read	BD
SD926	Error times of module write	module 1
SD927	Error types of module write	
SD928	Error times of module read	
SD929	Error types of module read	BD
SD930	Error times of module write	module 2
SD931	Error types of module write	
SD932	Error times of module read	
SD933	Error types of module read	ED
SD934	Error times of module write	module 1
SD935	Error types of module write	

Version info (SD990~SD993)

ID	Function	Explanation	Note
SD990	Firmware version date	Low 16-bit	
SD991	Firmware version compilation date	High 16-bit	
SD992	FPGA version compilation date	Low 16-bit	
SD993	FPGA version compilation date	High 16-bit	

High speed pulse (SD1000-SD1099)

ID	Function	Explanation	Output point
SD1000	Present segment (segment n)		
SD1001			
SD1002	Present pulse number low 16-bit	(the unit is pulse number)	Y0
18101003	Present pulse number high 16-bit	(the unit is pulse number)	ŶŬ
SD1004	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1005	Present pulse number high	(the unit is pulse equivalent)	

	16-bit		
	Present output frequency low 16-bit		
	Present output frequency high 16-bit		
		(the unit is pulse equivalent)	
SD1009	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1010	Pulse error information	1: pulse data segment configuration error 2: In equivalent mode, the number of pulses per turn and the movement per 1 turn is 0. 3: System parameter block number error 4: Pulse parameter block number exceeding maximum limit 5: Stop after encountering positive limit signal 6: Stop after meeting the negative limit signal 10: No origin signal is set for origin regression 11:Velocity of origin regression VH is 0 12: Origin regression crawling speed VC is 0 or VC \ge VH) 13: Origin regression signal error 15:Follow Performance Parameters \le 0 or >100 16:Follow Feedforward Compensation < 0 or >100 17:Follow Multiplication Coefficient and Division Coefficient Ratio \le 0 or >100 20: Interpolation Direction Terminal Not Set or Set Error 21: The default maximum interpolation speed is 0 22: Arc interpolation data error 23: Arc radius data error 24:Three-point Arc Data Error 25: In polar coordinate mode, the current position is (0, 0) 26: Control block allocation failed	
	number		
SD1020 SD1021	Present segment (segment n)		Y
	Present pulse number low 16-bit	(the unit is pulse number)	

	Present pulse number high		
SD1023	16-bit	(the unit is pulse number)	
SD1024	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1025	Present pulse number high 16-bit	(the unit is pulse equivalent)	
SD1026	Present output frequency low 16-bit	(the unit is pulse number)	
SD1027	Present output frequency high 16-bit	(the unit is pulse number)	
SD1028	Present output frequency low 16-bit	(the unit is pulse equivalent)	
SD1029	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1030	Pulse error information	Same to SD1010	
SD1031	error pulse data block number		
SD1040	Present segment (segment n)		
SD1041			
SD1042	Present pulse number low 16-bit	(the unit is pulse number)	
SD1043	Present pulse number high 16-bit	(the unit is pulse number)	
SD1044	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1045	Present pulse number high 16-bit	(the unit is pulse equivalent)	
SD1046	Present output frequency low 16-bit	(the unit is pulse number)	Y2
SD1047	Present output frequency high 16-bit	(the unit is pulse number)	
SD1048	Present output frequency low 16-bit	(the unit is pulse equivalent)	
SD1049	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1050	Pulse error information	Same to SD1010	
SD1051	error pulse data block number		
SD1060	Present segment		Y3
221000			15

	(segment n)		
SD1061			
SD1062	Present pulse number low 16-bit	(the unit is pulse number)	
SD1063	Present pulse number high 16-bit	(the unit is pulse number)	
SD1064	Present pulse number low 16-bit	(the unit is pulse equivalent)	
		(the unit is pulse equivalent)	
SD1066	Present output frequency low 16-bit	(the unit is pulse number)	
SD1067	Present output frequency high 16-bit	(the unit is pulse number)	
SD1068	Present output frequency low 16-bit	(the unit is pulse equivalent)	
SD1069	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1070	Pulse error information	Same to SD1010	
SD1071	error pulse data block number		
SD1080	Present segment (segment n)		
SD1082	Present pulse number low 16-bit	(the unit is pulse number)	
SD1083	Present pulse number high 16-bit	(the unit is pulse number)	
SD1084	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1085	Present pulse number high 16-bit	(the unit is pulse equivalent)	Y4
SD1086	Present output frequency low 16-bit	(the unit is pulse number)	
SD1087	Present output frequency high 16-bit	(the unit is pulse number)	
SD1088	Present output frequency low 16-bit	(the unit is pulse equivalent)	
SD1089	Present output frequency high 16-bit	(the unit is pulse equivalent)	
501000	Pulse error information	Same to SD1010	

SD1091	error pulse data block number		
SD1100	Present segment (segment n)		
SD1102	Present pulse number low 16-bit	(the unit is pulse number)	
SD1103	Present pulse number high 16-bit	(the unit is pulse number)	
SD1104	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1105	Present pulse number high 16-bit	(the unit is pulse equivalent)	
	Present output frequency low 16-bit		Y5
	Present output frequency high 16-bit		
SD1108	Present output frequency low 16-bit	(the unit is pulse equivalent)	
SD1109	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1110	Pulse error information	Same to SD1010	
SD1111	error pulse data block number		
SD1120	Present segment (segment n)		
SD1122	Present pulse number low 16-bit	(the unit is pulse number)	
SD1123	Present pulse number high 16-bit	(the unit is pulse number)	
SD1124	Present pulse number low 16-bit	(the unit is pulse equivalent)	Y6
SD1125	Present pulse number high 16-bit	(the unit is pulse equivalent)	
SD1126	Present output frequency low 16-bit	(the unit is pulse number)	
SD1127	Present output frequency high 16-bit	(the unit is pulse number)	
SD1128	Present output frequency	(the unit is pulse equivalent)	

	low 16-bit		
SD1129	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1130	Pulse error information	Same to SD1010	
SD1131	error pulse data block number		
SD1140	Present segment (segment n)		
SD1142	Present pulse number low 16-bit	(the unit is pulse number)	
SD1143	Present pulse number high 16-bit	(the unit is pulse number)	
SD1144	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1145	16-bit	(the unit is pulse equivalent)	
SD1146	Present output frequency low 16-bit	(the unit is pulse number)	Y7
SD1147	high 16-bit	(the unit is pulse number)	
SD1148		(the unit is pulse equivalent)	
SD1149	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1150	Pulse error information	Same to SD1010	
SD1151	error pulse data block number		
SD1160	Present segment (segment n)		
SD1162	Present pulse number low 16-bit	(the unit is pulse number)	
SD1163	Present pulse number high 16-bit	(the unit is pulse number)	Y10
SD1164	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1165	Present pulse number high 16-bit	(the unit is pulse equivalent)	
SD1166	Present output frequency	(the unit is pulse number)	

	low 16-bit		
SD1167	Present output frequency high 16-bit	(the unit is pulse number)	
SD1168	Present output frequency low 16-bit	(the unit is pulse equivalent)	
SD1169	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1170	Pulse error information	Same to SD1010	
SD1171	error pulse data block number		
SD1180	Present segment (segment n)		
SD1182	Present pulse number low 16-bit	(the unit is pulse number)	
SD1183	Present pulse number high 16-bit	(the unit is pulse number)	
SD1184	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1185	Present pulse number high 16-bit	(the unit is pulse equivalent)	
SD1186	Present output frequency low 16-bit	(the unit is pulse number)	Y11
SD1187	Present output frequency high 16-bit	(the unit is pulse number)	
SD1188	Present output frequency low 16-bit	(the unit is pulse equivalent)	
SD1189	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1190	Pulse error information	Same to SD1010	
SD1191	error pulse data block number		

Special data register HSD (power-off retentive)

	High speed pulse		-	
ID	Function	Explanation	Output point	
	Accumulated pulse number low 16-bit			
HSD0	(the unit is pulse number)			
	Accumulated pulse number high 16-bit			
HSD1	(the unit is pulse number)		- Y0	
	Accumulated pulse number low 16-bit		10	
HSD2	(the unit is pulse equivalent)			
	Accumulated pulse number high 16-bit			
HSD3	(the unit is pulse equivalent)			
	Accumulated pulse number low 16-bit			
HSD4	(the unit is pulse number)			
	Accumulated pulse number high 16-bit			
HSD5	(the unit is pulse number)		V1	
	Accumulated pulse number low 16-bit		Y1	
HSD6	(the unit is pulse equivalent)			
	Accumulated pulse number high 16-bit			
HSD7	(the unit is pulse equivalent)			
	Accumulated pulse number low 16-bit			
HSD8	(the unit is pulse number)			
	Accumulated pulse number high 16-bit			
HSD9	(the unit is pulse number)		N/O	
	Accumulated pulse number low 16-bit		Y2	
HSD10	(the unit is pulse equivalent)			
	Accumulated pulse number high 16-bit			
HSD11	(the unit is pulse equivalent)			
	Accumulated pulse number low 16-bit			
HSD12	(the unit is pulse number)			
	Accumulated pulse number high 16-bit			
HSD13	(the unit is pulse number)			
	Accumulated pulse number low 16-bit		- Y3	
HSD14	(the unit is pulse equivalent)			
	Accumulated pulse number high 16-bit		1	
HSD15	(the unit is pulse equivalent)			
	Accumulated pulse number low 16-bit			
HSD16	(the unit is pulse number)			
	Accumulated pulse number high 16-bit			
HSD17	(the unit is pulse number)		Y4	
	Accumulated pulse number low 16-bit			
HSD18	(the unit is pulse equivalent)			

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	Accumulated pulse number high 16-bit	
HSD19	(the unit is pulse equivalent)	
115017	Accumulated pulse number low 16-bit	
HSD20	(the unit is pulse number)	
115D20	Accumulated pulse number high 16-bit	
HSD21	(the unit is pulse number)	
115D21	Accumulated pulse number low 16-bit	Y5
HSD22	(the unit is pulse equivalent)	
П5D22		
HSD23	Accumulated pulse number high 16-bit	
HSD25	(the unit is pulse equivalent)	
110024	Accumulated pulse number low 16-bit	
HSD24	(the unit is pulse number)	
110025	Accumulated pulse number high 16-bit	
HSD25	(the unit is pulse number)	Y6
HEDO	Accumulated pulse number low 16-bit	
HSD26	(the unit is pulse equivalent)	
	Accumulated pulse number high 16-bit	
HSD27	(the unit is pulse equivalent)	
	Accumulated pulse number low 16-bit	
HSD28	(the unit is pulse number)	
	Accumulated pulse number high 16-bit	
HSD29	(the unit is pulse number)	Y7
	Accumulated pulse number low 16-bit	
HSD30	(the unit is pulse equivalent)	
	Accumulated pulse number high 16-bit	
HSD31	(the unit is pulse equivalent)	
	Accumulated pulse number low 16-bit	
HSD32	(the unit is pulse number)	
	Accumulated pulse number high 16-bit	
HSD33	(the unit is pulse number)	Y10
	Accumulated pulse number low 16-bit	110
HSD34	(the unit is pulse equivalent)	
	Accumulated pulse number high 16-bit	
HSD35	(the unit is pulse equivalent)	
	Accumulated pulse number low 16-bit	
HSD36	(the unit is pulse number)	
	Accumulated pulse number high 16-bit	
HSD37	(the unit is pulse number)	V 11
	Accumulated pulse number low 16-bit	Y11
HSD38	(the unit is pulse equivalent)	
	Accumulated pulse number high 16-bit	
HSD39	(the unit is pulse equivalent)	

Appendix 3. Special FLASH register list

Special FLASH data register SFD

* means it works only after repower on the PLC

I filtering

ID	Function	Description
SFD0*	Input filter time	
SFD2*	Watchdog run-up time, default value is 200ms	

I Mapping

ID	Function	Description	
SFD10*	I00 corresponds to X**	Input terminal 0 corresponds to X** number	0xFF means terminal bad, 0xFE means terminal idle
SFD11*	I01 corresponds to X**		
SFD12*	I02 corresponds to X**		
SFD73*	I77 corresponds to X**	Default value is 77 (Octonary)	

O Mapping

ID	Function	Description	
SFD74*	O00 corresponds to Y**	Output terminal 0 correspond to Y** number	0xFF means terminal bad, 0xFE means terminal idle
		Default value is 0	
SFD134*	O77 corresponds to Y**	Default value is 77 (Octonary)	

I Attribute

ID	Function	Description	
SFD138*	I00 attribute	Attribute of input terminal 0	0: positive logic others: negative logic
SFD139*	I01 attribute		
SFD201*	I77 attribute		

ID	Function	Description
050220		2: 2 times frequency; 4: 4 times frequency(effective
SFD320	HSC0 frequency times	at AB phase counting mode)
SFD321	HSC2 frequency times	Ditto
SFD322	HSC4 frequency times	Ditto
SFD323	HSC6 frequency times	Ditto
SFD324	HSC8 frequency times	Ditto
SFD325	HSC10 frequency times	Ditto
SFD326	HSC12 frequency times	Ditto
SFD327	HSC14 frequency times	Ditto
SFD328	HSC16 frequency times	Ditto
SFD329	HSC18 frequency times	Ditto
		bit0 corresponds to HSC0, bit1corresponds to
SFD330	Bit selection of HSC absolute	HSC2, and so on, bit9 corresponds to HSC18
560550	and relative (24 segment)	0: relative
		1: absolute
		bit0 corresponds to HSC0, bit1corresponds to
SFD331	Interrupt circulating of 24	HSC2, and so on, bit9 corresponds to HSC18
51 0 5 5 1	segments high speed counting	0: single
		1: loop
		bit0 corresponds to HSC0, bit1corresponds to
SFD332	CAM function	HSC2, and so on, bit9 corresponds to HSC18
51 0 5 5 2		0: do not support CAM function
		1: support CAM function

High Speed Counting

Expansion Module Configuration

ID	Function	Explanation
SED240	Extension module configuration status	Configuration Status of Extension
SFD340	(#1#2)	Modules 1 and 2
SFD341	Extension module configuration status	Configuration Status of Extension
560541	(#3#4)	Modules 3 and 4
•••••		
SFD347	Extension module configuration status	Configuration Status of Extension
560547	(#15#16)	Modules 15 and 16
SFD348	BD module configuration status (#1#2)	Configuration Status of BD Modules 1
51 0 540	BD module configuration status (#1#2)	and 2
SFD349	ED module configuration status (#1)	Configuration Status of ED Module 1
SFD350	Extension module configuration	
:		Configuration of Extension Module 1
SFD359	1	
SFD360	Extension module configuration	Configuration of Extension Module 2
:		Configuration of Extension Module 2

SFD369		
:	:	
SFD500		
:	Extension module configuration	Configuration of Extension Module 16
SFD509		
SFD510		
:	BD module configuration	Configuration of BD Module 1
SFD519		
SFD520		
:	BD module configuration	Configuration of BD Module 2
SFD529		
SFD530		
:	ED module configuration	Configuration of ED Module 1
SFD539		

Communication

	-	
ID	Function	Note
	COM1 free format communication	0.014 1.1(14)
SFD600	buffer bit numbers	0: 8-bit 1: 16-bit
SFD610	COM2 free format communication	0: 8-bit 1: 16-bit
SFD010	buffer bit numbers	0: 8-bit 1: 16-bit
SFD620	COM3 free format communication	0: 8-bit 1: 16-bit
SFD020	buffer bit numbers	0. 8-011 1. 10-011
SFD630	COM4 free format communication	0: 8-bit 1: 16-bit
SFD030	buffer bit numbers	0: 8-bit 1: 16-bit
SFD640	COM5 free format communication	0: 8-bit 1: 16-bit
5510040	buffer bit numbers	0. 8-01t 1. 10-01t

ID	function	Explanation
	Y0 (common	-
SFD900	Pulse parameters	Bit 1: Pulse Direction Logic 0: positive logic, 1: negative logic; default is 0 Bit 2: Soft Limit 0: Not enabled, 1: enabled; default is 0 Bit 3: direction of mechanical return to origin 0: Negative, 1: Positive; Default is 0 Bit 10~8: Pulse Unit Bit 8: 0: Number of Pulses, 1:Equivalent 000: Number of pulses 001: 1 μm 011: 0.01 μm 101: 0.1 μm 111: 1 mm The default is 000. Bit15: Interpolated coordinate mode 0: Cross coordinates, 1: Polar coordinates; The default is 0.
SFD901	Pulse sending mode	Bit 0: pulse sending mode 0: complete mode; 1: continue mode Default is 0
SFD902	Pulse number/1 rotation low 16-bit	
SFD903	Pulse number/1 rotation high 16-bit	
SFD904	Moving amount/1 rotation low 16-bit	
SFD905	Moving amount/1 rotation high 16-bit	
SFD906	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD907	Direction delay time	Default is 20, unit: ms
SFD908	Gear clearance positive compensation	
SFD909	Gear clearance negative compensation	
SFD910	Electrical origin position low 16-bit	
SFD911	Electrical origin position high 16-bit	
SFD912	Signal terminal switch state	 Bit0: Origin Signal Switch State Settings Bit1:Z Phase Switch State Settings Bit2: Positive Limit Switching State Settings Bit3: Negative Limit Switching State Settings 0: Normally open (positive logic), 1: Normally
		closed (negative logic); default is 0

Motion control

		D:40 D:47 Creatify the number of the V
SFD914	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal
SFD915	Limit terminal setting	Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.
SFD917	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y terminal, 0xFF is no terminal
SFD918	Return speed VH low 16-bit	
SFD919	Return speed VH high 16-bit	
SFD922	Creeping speed VC low 16-bit	
SFD923	Creeping speed VC high 16-bit	
SFD924	Mechanical origin position low 16-bit	
SFD925	Mechanical origin position high 16-bit	
SFD926	Z phase number	
SFD927	CLR signal delay time	Default is 20, unit: ms
SFD928	Grinding wheel radius (polar	Low 16-bit
SFD929	coordinates)	High 16-bit
SFD930		Low 16-bit
SFD931	Soft limit positive value	High 16-bit
SFD932		Low 16-bit
SFD933	Soft limit negative value	High 16-bit
•••		
	Y0 (group 1 p	parameters)
SFD950	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD951	Pulse default speed high 16-bit	speed is 0.
SFD952	Acceleration time of pulse default speed	
	-P	
SFD953	deceleration time of pulse default speed	
SFD953 SFD954	deceleration time of pulse default	
	deceleration time of pulse default speed	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD954	deceleration time of pulse default speed Accerlation and deceleration time Acceleration/deceleration mode	00: linear acc/dec01: S curve acc/dec10: sine curve acc/dec11: reserved
SFD954 SFD955	deceleration time of pulse default speed Accerlation and deceleration time Acceleration/deceleration mode Max speed low 16-bit	00: linear acc/dec01: S curve acc/dec10: sine curve acc/dec11: reserved
SFD954 SFD955 SFD956	deceleration time of pulse default speed Accerlation and deceleration time Acceleration/deceleration mode	00: linear acc/dec01: S curve acc/dec10: sine curve acc/dec11: reserved

SFD960	Stop speed low 16-bit	
SFD961	Stop speed high 16-bit	
SFD962	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD963	Follow feedforward compensation	0~100, %
	Y0 (group 2 p	parameters)
SFD970	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD971	Pulse default speed high 16-bit	speed is 0.
SFD972	Acceleration time of pulse default speed	
SFD973	deceleration time of pulse default speed	
SFD974	Accerlation and deceleration time	
SFD975	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD976	Max speed low 16-bit	
SFD977	Max speed high 16-bit	
SFD978	Initial speed low 16-bit	
SFD979	Initial speed high 16-bit	
SFD980	Stop speed low 16-bit	
SFD981	Stop speed high 16-bit	
SFD982	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD983	Follow feedforward compensation	0~100, %
•••		
	Y0 (group 3 p	parameters)
SFD990	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD991	Pulse default speed high 16-bit	speed is 0.
SFD992	Acceleration time of pulse default speed	
SFD993	deceleration time of pulse default speed	
SFD994	Accerlation and deceleration time	
	•	•

		Γ
		Bit1~Bit0: acc/dec mode
SFD995		00: linear acc/dec
	Acceleration/deceleration mode	01: S curve acc/dec
		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD996	Max speed low 16-bit	
SFD997	Max speed high 16-bit	
SFD998	Initial speed low 16-bit	
SFD999	Initial speed high 16-bit	
SFD1000	Stop speed low 16-bit	
SFD1001	Stop speed high 16-bit	
		1~100, 100 means the time constant is 1 Tick,
SFD1002	Follow performance	1 means the time constant is 100 Ticks
SFD1003	Follow feedforward compensation	0~100, %
•••		
	Y0 (group 4 p	parameters)
SFD1010	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1011	Pulse default speed high 16-bit	speed is 0.
CED1012	Acceleration time of pulse default	
SFD1012	speed	
SED1012	deceleration time of pulse default	
SFD1013	speed	
SFD1014	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
	Acceleration/deceleration mode	00: linear acc/dec
SFD1015		01: S curve acc/dec
SFD1015		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1016	Max speed low 16-bit	
SFD1017	Max speed high 16-bit	
SFD1018	Initial speed low 16-bit	
SFD1019	Initial speed high 16-bit	
SFD1020	Stop speed low 16-bit	
SFD1021	Stop speed high 16-bit	
SED1000		1~100, 100 means the time constant is 1 Tick,
SFD1022	Follow performance	1 means the time constant is 100 Ticks
SFD1023	Follow feedforward compensation	0~100, %
Y1 (common parameters)		
(·····································		

<u>г</u>		
		Bit 1: Pulse Direction Logic
		0: positive logic, 1: negative logic; default is 0
		Bit 2: Soft Limit
		0: Not enabled, 1: enabled; default is 0
		Bit 3: direction of mechanical return to origin
		0: Negative, 1: Positive; Default is 0
		Bit 10~8: Pulse Unit
		Bit 8: 0: Number of Pulses, 1:Equivalent
SFD1030	Pulse parameters	000: Number of pulses
		001: 1 μm
		011: 0.01 μm
		101: 0.1 μm
		111: 1 mm
		The default is 000.
		Bit15: Interpolated coordinate mode
		0: Cross coordinates, 1: Polar coordinates;
		The default is 0.
		Bit 0: pulse sending mode
SFD1031	Pulse sending mode	0: complete mode; 1: continue mode
		Default is 0
SFD1032	Pulse number/1 rotation low 16-bit	
SFD1033	Pulse number/1 rotation high 16-bit	
CED1024	Moving amount/1 rotation low	
SFD1034	16-bit	
SFD1035	Moving amount/1 rotation high	
SFD1055	16-bit	
SFD1036	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1037	Direction delay time	Default is 20, unit: ms
SFD1038	Gear clearance positive	
51/01058	compensation	
SFD1039	Gear clearance negative	
51/01/039	compensation	
SFD1040	Electrical origin position low 16-bit	
SFD1041	Electrical origin position high 16-bit	
		Bit0: Origin Signal Switch State Settings
		Bit1:Z Phase Switch State Settings
SFD1042		Bit2: Positive Limit Switching State Settings
51/01/042	Signal terminal switch state	Bit3: Negative Limit Switching State Settings
		0: Normally open (positive logic), 1: Normally
		closed (negative logic); default is 0
SFD1044	Near-point signal terminal setting	
0001047		
SFD1045	Z phase terminal setting	Bit0~Bit7: Specify the number of the X

		Bit7~Bit0: Specifies the X terminal number of
SFD1047	Limit terminal setting	the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number
		of the negative limit, and 0xFF is no terminal.
SFD1048	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y
SFD1049	Return speed VH low 16-bit	terminal, 0xFF is no terminal
SFD1052	Return speed VH high 16-bit	
SFD1053	Creeping speed VC low 16-bit	
SFD1054	Creeping speed VC high 16-bit	
SFD1055	Mechanical origin position low 16-bit	
SFD1056	Mechanical origin position high 16-bit	
SFD1057	Z phase number	
SFD1058	CLR signal delay time	Default is 20, unit: ms
0001070	Grinding wheel radius (polar	
SFD1059	coordinates)	Low 16-bit
SFD1060		High 16-bit
SFD1061	Soft limit positive value	Low 16-bit
SFD1062		High 16-bit
SFD1063	Soft limit negative value	Low 16-bit
•••		
	Y1 (group 1 p	parameters)
SFD1080	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1081	Pulse default speed high 16-bit	speed is 0.
SFD1082	Acceleration time of pulse default speed	
SFD1083	deceleration time of pulse default speed	
SFD1084	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
0FD1005	Acceleration/deceleration mode	01: S curve acc/dec
SFD1085		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1086	Max speed low 16-bit	
SFD1087	Max speed high 16-bit	
SFD1088	Initial speed low 16-bit	
SFD1089	Initial speed high 16-bit	
SFD1090	Stop speed low 16-bit	

		$1 \sim 100, 100$ means the time constant is 1 Tick,
SFD1092	Follow performance	1 means the time constant is 100 Ticks
SFD1093	Follow feedforward compensation	0~100, %
•••	r	
	Y1 (group 2 p	parameters)
SFD1100	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1101	Pulse default speed high 16-bit	speed is 0.
GED 1100	Acceleration time of pulse default	
SFD1102	speed	
GED1102	deceleration time of pulse default	
SFD1103	speed	
SFD1104	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1105	Applaration/decalaration	01: S curve acc/dec
SFD1105	Acceleration/deceleration mode	10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1106	Max speed low 16-bit	
SFD1107	Max speed high 16-bit	
SFD1108	Initial speed low 16-bit	
SFD1109	Initial speed high 16-bit	
SFD1110	Stop speed low 16-bit	
SFD1111	Stop speed high 16-bit	
SFD1112	E II.	1~100, 100 means the time constant is 1 Tick,
51 01112	Follow performance	1 means the time constant is 100 Ticks
SFD1113	Follow feedforward compensation	0~100, %
•••		
	Y1 (group 3 p	parameters)
SFD1120	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1121	Pulse default speed high 16-bit	speed is 0.
SFD1122	Acceleration time of pulse default	
511122	speed	
SFD1123	deceleration time of pulse default	
51 D 1125	speed	
SFD1124	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1125	Acceleration/deceleration mode	01: S curve acc/dec
2.21120		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1126	Max speed low 16-bit	

SFD1127	Max speed high 16-bit	
SFD1128	Initial speed low 16-bit	
SFD1129	Initial speed high 16-bit	
SFD1130	Stop speed low 16-bit	
SFD1131	Stop speed high 16-bit	
SFD1132	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1133	Follow feedforward compensation	0~100, %
	Y1 (group 4 p	parameters)
SFD1140	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1141	Pulse default speed high 16-bit	speed is 0.
SFD1142	Acceleration time of pulse default speed	
SFD1143	deceleration time of pulse default speed	
SFD1144	Accerlation and deceleration time	
SFD1145	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1146	Max speed low 16-bit	
SFD1147	Max speed high 16-bit	
SFD1148	Initial speed low 16-bit	
SFD1149	Initial speed high 16-bit	
SFD1150	Stop speed low 16-bit	
SFD1151	Stop speed high 16-bit	
SFD1152	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1153	Follow feedforward compensation	0~100, %
•••		
	Y2 (common	parameters)

		 Bit 1: Pulse Direction Logic 0: positive logic, 1: negative logic; default is 0 Bit 2: Soft Limit 0: Not enabled, 1: enabled; default is 0 Bit 3: direction of mechanical return to origin
		Bit 2: Soft Limit 0: Not enabled, 1: enabled; default is 0 Bit 3: direction of mechanical return to origin
		0: Not enabled, 1: enabled; default is 0 Bit 3: direction of mechanical return to origin
		Bit 3: direction of mechanical return to origin
		_
		0: Negative, 1: Positive; Default is 0
		Bit 10~8: Pulse Unit
		Bit 8: 0: Number of Pulses, 1:Equivalent
SFD1160 P	Pulse parameters	000: Number of pulses
		001: 1 μm
		011: 0.01 μm
		101: 0.1 μm
		111: 1 mm
		The default is 000.
		Bit15: Interpolated coordinate mode
		0: Cross coordinates, 1: Polar coordinates;
		The default is 0.
		Bit 0: pulse sending mode
SFD1161 P	Pulse sending mode	0: complete mode; 1: continue mode
		Default is 0
SFD1162 P	Pulse number/1 rotation low 16-bit	
SFD1163 P	Pulse number/1 rotation high 16-bit	
N N	Moving amount/1 rotation low	
SFD1164	l6-bit	
N N	Moving amount/1 rotation high	
SFD1165	6-bit	
SFD1166 P	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1167 D	Direction delay time	Default is 20, unit: ms
GED11(9) G	Gear clearance positive	
SFD1168 c	compensation	
GED 11 (O	Gear clearance negative	
SFD1169 c	compensation	
SFD1170 E	Electrical origin position low 16-bit	
SFD1171 E	Electrical origin position high 16-bit	
		Bit0: Origin Signal Switch State Settings
		Bit1:Z Phase Switch State Settings
QED 1172		Bit2: Positive Limit Switching State Settings
SFD1172 S	Signal terminal switch state	Bit3: Negative Limit Switching State Settings
		0: Normally open (positive logic), 1: Normally
		closed (negative logic); default is 0
SFD1174 N	Near-point signal terminal setting	-
		Bit0~Bit7: Specify the number of the X
SFD1175 Z	Z phase terminal setting	terminal, 0xFF is no terminal
		Bit1:Z Phase Switch State Settings

		Bit7~Bit0: Specifies the X terminal number of
SFD1177	Limit terminal setting	the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number
		of the negative limit, and 0xFF is no terminal.
SFD1178	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y
SFD1179	Return speed VH low 16-bit	terminal, 0xFF is no terminal
SFD1182	Return speed VH high 16-bit	
SFD1183	Creeping speed VC low 16-bit	
SFD1184	Creeping speed VC high 16-bit	
SFD1185	Mechanical origin position low 16-bit	
SFD1186	Mechanical origin position high 16-bit	
SFD1187	Z phase number	
SFD1188	CLR signal delay time	Default is 20, unit: ms
0001100	Grinding wheel radius (polar	
SFD1189	coordinates)	Low 16-bit
SFD1190		High 16-bit
SFD1191	Soft limit positive value	Low 16-bit
SFD1192		High 16-bit
SFD1193	Soft limit negative value	Low 16-bit
	Y2 (group 1 p	parameters)
SFD1210	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1211	Pulse default speed high 16-bit	speed is 0.
SFD1212	Acceleration time of pulse default speed	
SFD1213	deceleration time of pulse default speed	
SFD1214	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
CED1015	Acceleration/deceleration mode	01: S curve acc/dec
SFD1215		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1216	Max speed low 16-bit	
SFD1217	Max speed high 16-bit	
SFD1218	Initial speed low 16-bit	
	1	
SFD1219	Initial speed high 16-bit	
SFD1219 SFD1220	· ·	

SFD1223 I I SFD1230 I SFD1231 I SFD1232 I SFD1232 I SFD1233 I SFD1233 I SFD1233 I	Follow performance Follow feedforward compensation Y2 (group 2 p Pulse default speed low 16-bit Pulse default speed high 16-bit Acceleration time of pulse default speed deceleration time of pulse default	 1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks 0~100, % Parameters) Pulse is sent at the default speed when the speed is 0.
SFD1230 I SFD1231 I SFD1232 2 SFD1233 2 SFD1233 2	Y2 (group 2 p Pulse default speed low 16-bit Pulse default speed high 16-bit Acceleration time of pulse default speed	0~100, % parameters) Pulse is sent at the default speed when the
SFD1230 I SFD1231 I SFD1232 2 SFD1233 2 SFD1233 2	Y2 (group 2 p Pulse default speed low 16-bit Pulse default speed high 16-bit Acceleration time of pulse default speed	parameters) Pulse is sent at the default speed when the
SFD1230 I SFD1231 I SFD1232 2 SFD1233 5 SFD1233 5	Pulse default speed low 16-bit Pulse default speed high 16-bit Acceleration time of pulse default speed	Pulse is sent at the default speed when the
SFD1231 I SFD1232 4 SFD1233 5 SFD1233 5	Pulse default speed low 16-bit Pulse default speed high 16-bit Acceleration time of pulse default speed	Pulse is sent at the default speed when the
SFD1231 I SFD1232 4 SFD1233 5 SFD1233 5	Pulse default speed high 16-bit Acceleration time of pulse default speed	_
SFD1232 SFD1233 SFD1233	Acceleration time of pulse default speed	
SFD1232 SFD1233	speed	
SFD1233	deceleration time of pulse default	
SFD1234	speed	
	Accerlation and deceleration time	
SFD1235	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1236	Max speed low 16-bit	
SFD1237	Max speed high 16-bit	
SFD1238 1	Initial speed low 16-bit	
SFD1239 I	Initial speed high 16-bit	
SFD1240 S	Stop speed low 16-bit	
SFD1241 S	Stop speed high 16-bit	
SFD1242	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1243 1	Follow feedforward compensation	0~100, %
•••		
	Y2 (group 3 p	parameters)
SFD1250 I	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1251 I	Pulse default speed high 16-bit	speed is 0.
SFD1252	Acceleration time of pulse default speed	
SFD1253	deceleration time of pulse default speed	
SFD1254	Accerlation and deceleration time	
SFD1255	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1256	Max speed low 16-bit	

SFD1257	Max speed high 16-bit	
SFD1258	Initial speed low 16-bit	
SFD1259	Initial speed high 16-bit	
SFD1260	Stop speed low 16-bit	
SFD1261	Stop speed high 16-bit	
SFD1262	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1263	Follow feedforward compensation	0~100, %
	Y2 (group 4 p	parameters)
SFD1270	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1271	Pulse default speed high 16-bit	speed is 0.
SFD1272	Acceleration time of pulse default speed	
SFD1273	deceleration time of pulse default speed	
SFD1274	Accerlation and deceleration time	
SFD1275	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1276	Max speed low 16-bit	
SFD1277	Max speed high 16-bit	
SFD1278	Initial speed low 16-bit	
SFD1279	Initial speed high 16-bit	
SFD1280	Stop speed low 16-bit	
SFD1281	Stop speed high 16-bit	
SFD1282	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1283	Follow feedforward compensation	0~100, %
	-	
	Y3 (common)	parameters)

	l	
		Bit 1: Pulse Direction Logic
		0: positive logic, 1: negative logic; default is 0
		Bit 2: Soft Limit
		0: Not enabled, 1: enabled; default is 0
		Bit 3: direction of mechanical return to origin
		0: Negative, 1: Positive; Default is 0
		Bit 10~8: Pulse Unit
		Bit 8: 0: Number of Pulses, 1:Equivalent
SFD1290	Pulse parameters	000: Number of pulses
		001: 1 μm
		011: 0.01 μm
		101: 0.1 μm
		111: 1 mm
		The default is 000.
		Bit15: Interpolated coordinate mode
		0: Cross coordinates, 1: Polar coordinates;
		The default is 0.
		Bit 0: pulse sending mode
SFD1291	Pulse sending mode	0: complete mode; 1: continue mode
		Default is 0
SFD1292	Pulse number/1 rotation low 16-bit	
SFD1293	Pulse number/1 rotation high 16-bit	
	Moving amount/1 rotation low	
SFD1294	16-bit	
0001005	Moving amount/1 rotation high	
SFD1295	16-bit	
SFD1296	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1297	Direction delay time	Default is 20, unit: ms
GED 1000	Gear clearance positive	
SFD1298	compensation	
GED 1000	Gear clearance negative	
SFD1299	compensation	
SFD1300	Electrical origin position low 16-bit	
SFD1301	Electrical origin position high 16-bit	
	-	Bit0: Origin Signal Switch State Settings
		Bit1:Z Phase Switch State Settings
00001000		Bit2: Positive Limit Switching State Settings
SFD1302	Signal terminal switch state	Bit3: Negative Limit Switching State Settings
		0: Normally open (positive logic), 1: Normally
		closed (negative logic); default is 0
SFD1304	Near-point signal terminal setting	
		Bit0~Bit7: Specify the number of the X
SFD1305	Z phase terminal setting	terminal, 0xFF is no terminal
		verminal, one i to no verminal

		Bit7~Bit0: Specifies the X terminal number of
SFD1307	Limit terminal setting	the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.
SFD1308	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y
SFD1309	Return speed VH low 16-bit	terminal, 0xFF is no terminal
SFD1312	Return speed VH high 16-bit	
SFD1313	Creeping speed VC low 16-bit	
SFD1314	Creeping speed VC high 16-bit	
SFD1315	Mechanical origin position low 16-bit	
SFD1316	Mechanical origin position high 16-bit	
SFD1317	Z phase number	
SFD1318	CLR signal delay time	Default is 20, unit: ms
SFD1319	Grinding wheel radius (polar coordinates)	Low 16-bit
SFD1320		High 16-bit
SFD1321	Soft limit positive value	Low 16-bit
SFD1322		High 16-bit
SFD1323	Soft limit negative value	Low 16-bit
	Y3 (group 1 p	parameters)
SFD1340	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1341	Pulse default speed high 16-bit	speed is 0.
SFD1342	Acceleration time of pulse default speed	
SFD1343	deceleration time of pulse default speed	
SFD1344	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1345	Acceleration/deceleration mode	01: S curve acc/dec
5601545		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1346	Max speed low 16-bit	
SFD1347	Max speed high 16-bit	
SFD1348	Initial speed low 16-bit	
SFD1349	Initial speed high 16-bit	
SFD1350	Stop speed low 16-bit	
~ 2121000	Stop speed high 16-bit	

		1 100 100 means the time constant is 1 Tick
SFD1352	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
CED1252		
SFD1353	Follow feedforward compensation	0~100, %
•••	V2 (
00012(0	Y3 (group 2 p	
SFD1360	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1361	Pulse default speed high 16-bit	speed is 0.
SFD1362	Acceleration time of pulse default speed	
SFD1363	deceleration time of pulse default speed	
SFD1364	Accerlation and deceleration time	
SFD1365	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1366	Max speed low 16-bit	
SFD1367	Max speed high 16-bit	
SFD1368	Initial speed low 16-bit	
SFD1369	Initial speed high 16-bit	
SFD1370	Stop speed low 16-bit	
SFD1371	Stop speed high 16-bit	
SFD1372	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1373	Follow feedforward compensation	0~100, %
•••		
	Y3 (group 3 p	barameters)
SFD1380	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1381	Pulse default speed high 16-bit	speed is 0.
SFD1382	Acceleration time of pulse default speed	
SFD1383	deceleration time of pulse default speed	
SFD1384	Accerlation and deceleration time	
SFD1385	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1386	Max speed low 16-bit	
-	1 I	

SFD1387	Max speed high 16-bit	
SFD1388	Initial speed low 16-bit	
SFD1389	Initial speed high 16-bit	
SFD1390	Stop speed low 16-bit	
SFD1391	Stop speed high 16-bit	
SFD1392	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1393	Follow feedforward compensation	0~100, %
	Y3 (group 4 p	barameters)
SFD1400	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1401	Pulse default speed high 16-bit	speed is 0.
SFD1402	Acceleration time of pulse default speed	
SFD1403	deceleration time of pulse default speed	
SFD1404	Accerlation and deceleration time	
SFD1405	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1406	Max speed low 16-bit	
SFD1407	Max speed high 16-bit	
SFD1408	Initial speed low 16-bit	
SFD1409	Initial speed high 16-bit	
SFD1410	Stop speed low 16-bit	
SFD1411	Stop speed high 16-bit	
SFD1412	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1413	Follow feedforward compensation	0~100, %
	-	
	Y4 (common)	parameters)

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		Bit 1: Pulse Direction Logic
		0: positive logic, 1: negative logic; default is 0
		Bit 2: Soft Limit
		0: Not enabled, 1: enabled; default is 0
		Bit 3: direction of mechanical return to origin
		0: Negative, 1: Positive; Default is 0
		Bit 10~8: Pulse Unit
		Bit 8: 0: Number of Pulses, 1:Equivalent
SFD1420	Pulse parameters	000: Number of pulses
		001: 1 μm
		011: 0.01 μm
		101: 0.1 μm
		111: 1 mm
		The default is 000.
		Bit15: Interpolated coordinate mode
		0: Cross coordinates, 1: Polar coordinates;
		The default is 0.
		Bit 0: pulse sending mode
SFD1421	Pulse sending mode	0: complete mode; 1: continue mode
		Default is 0
SFD1422	Pulse number/1 rotation low 16-bit	
SFD1423	Pulse number/1 rotation high 16-bit	
	Moving amount/1 rotation low	
SFD1424	16-bit	
0001405	Moving amount/1 rotation high	
SFD1425	16-bit	
SFD1426	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1427	Direction delay time	Default is 20, unit: ms
CED1420	Gear clearance positive	
SFD1428	compensation	
CED1400	Gear clearance negative	
SFD1429	compensation	
SFD1430	Electrical origin position low 16-bit	
SFD1431	Electrical origin position high 16-bit	
		Bit0: Origin Signal Switch State Settings
SFD1432	Signal terminal switch state	Bit1:Z Phase Switch State Settings
		Bit2: Positive Limit Switching State Settings
		Bit3: Negative Limit Switching State Settings
		0: Normally open (positive logic), 1: Normally
		closed (negative logic); default is 0
SFD1434	Near-point signal terminal setting	
0001407		Bit0~Bit7: Specify the number of the X
SFD1435	Z phase terminal setting	terminal, 0xFF is no terminal
L	l	

		Bit7~Bit0: Specifies the X terminal number of
SFD1437	Limit terminal setting	the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number
		of the negative limit, and 0xFF is no terminal.
SFD1438	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y
SFD1439	Return speed VH low 16-bit	terminal, 0xFF is no terminal
SFD1442	Return speed VH high 16-bit	
SFD1443	Creeping speed VC low 16-bit	
SFD1444	Creeping speed VC high 16-bit	
SFD1445	Mechanical origin position low 16-bit	
SFD1446	Mechanical origin position high 16-bit	
SFD1447	Z phase number	
SFD1448	CLR signal delay time	Default is 20, unit: ms
CED1440	Grinding wheel radius (polar	
SFD1449	coordinates)	Low 16-bit
SFD1450		High 16-bit
SFD1451	Soft limit positive value	Low 16-bit
SFD1452		High 16-bit
SFD1453	Soft limit negative value	Low 16-bit
	Y4 (group 1 p	parameters)
SFD1470	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1471	Pulse default speed high 16-bit	speed is 0.
SFD1472	Acceleration time of pulse default speed	
SFD1473	deceleration time of pulse default speed	
SFD1474	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
0FD1475	Acceleration/deceleration mode	01: S curve acc/dec
SFD1475		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1476	Max speed low 16-bit	
SFD1477	Max speed high 16-bit	
SFD1478	T 1/1 11 1/11	
-	Initial speed low 16-bit	
SFD1479	Initial speed low 16-bit Initial speed high 16-bit	

		$1 \sim 100, 100$ means the time constant is 1 Tick,
SFD1482	Follow performance	1 means the time constant is 100 Ticks
SFD1483	Follow feedforward compensation	0~100, %
•••	1	
	Y4 (group 2 p	parameters)
SFD1490	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1491	Pulse default speed high 16-bit	speed is 0.
GED 1 400	Acceleration time of pulse default	
SFD1492	speed	
SED1402	deceleration time of pulse default	
SFD1493	speed	
SFD1494	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1495	Acceleration/deceleration mode	01: S curve acc/dec
SFD1493	Acceleration/deceleration mode	10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1496	Max speed low 16-bit	
SFD1497	Max speed high 16-bit	
SFD1498	Initial speed low 16-bit	
SFD1499	Initial speed high 16-bit	
SFD1500	Stop speed low 16-bit	
SFD1501	Stop speed high 16-bit	
SFD1502	Follow performance	1~100, 100 means the time constant is 1 Tick,
SFD1502		1 means the time constant is 100 Ticks
SFD1503	Follow feedforward compensation	0~100, %
•••		
	Y4 (group 3 p	parameters)
SFD1510	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1511	Pulse default speed high 16-bit	speed is 0.
SFD1512	Acceleration time of pulse default	
51 D 1 5 1 2	speed	
SFD1513	deceleration time of pulse default	
51 0 15 15	speed	
SFD1514	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1515	Acceleration/deceleration mode	01: S curve acc/dec
		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1516	Max speed low 16-bit	

SFD1517	Max speed high 16-bit	
SFD1518	Initial speed low 16-bit	
SFD1519	Initial speed high 16-bit	
SFD1520	Stop speed low 16-bit	
SFD1521	Stop speed high 16-bit	
SFD1522	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1523	Follow feedforward compensation	0~100, %
	Y4 (group 4 p	parameters)
SFD1530	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1531	Pulse default speed high 16-bit	speed is 0.
SFD1532	Acceleration time of pulse default speed	
SFD1533	deceleration time of pulse default speed	
SFD1534	Accerlation and deceleration time	
SFD1535	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1536	Max speed low 16-bit	
SFD1537	Max speed high 16-bit	
SFD1538	Initial speed low 16-bit	
SFD1539	Initial speed high 16-bit	
SFD1540	Stop speed low 16-bit	
SFD1541	Stop speed high 16-bit	
SFD1542	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1543	Follow feedforward compensation	0~100, %
•••		
	Y5 (common	parameters)
(

		Bit 1: Pulse Direction Logic
		0: positive logic, 1: negative logic; default is 0
		Bit 2: Soft Limit
		0: Not enabled, 1: enabled; default is 0
		Bit 3: direction of mechanical return to origin
		0: Negative, 1: Positive; Default is 0
		Bit 10~8: Pulse Unit
		Bit 8: 0: Number of Pulses, 1:Equivalent
SFD1550	Pulse parameters	000: Number of pulses
		001: 1 μm
		011: 0.01 μm
		101: 0.1 μm
		111: 1 mm
		The default is 000.
		Bit15: Interpolated coordinate mode
		0: Cross coordinates, 1: Polar coordinates;
		The default is 0.
		Bit 0: pulse sending mode
SFD1551	Pulse sending mode	0: complete mode; 1: continue mode
		Default is 0
SFD1552	Pulse number/1 rotation low 16-bit	
SFD1553	Pulse number/1 rotation high 16-bit	
GED 1774	Moving amount/1 rotation low	
SFD1554	16-bit	
GDD 1555	Moving amount/1 rotation high	
SFD1555	16-bit	
SFD1556	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1557	Direction delay time	Default is 20, unit: ms
QED1559	Gear clearance positive	
SFD1558	compensation	
0001770	Gear clearance negative	
SFD1559	compensation	
SFD1560	Electrical origin position low 16-bit	
SFD1561	Electrical origin position high 16-bit	
	· · · · · · · · · · · · · · · · · · ·	Bit0: Origin Signal Switch State Settings
SFD1562		Bit1:Z Phase Switch State Settings
		Bit2: Positive Limit Switching State Settings
	Signal terminal switch state	Bit3: Negative Limit Switching State Settings
		0: Normally open (positive logic), 1: Normally
		closed (negative logic); default is 0
SFD1564	Near-point signal terminal setting	
		Bit0~Bit7: Specify the number of the X
SFD1565	Z phase terminal setting	terminal, 0xFF is no terminal
l		

		Bit7~Bit0: Specifies the X terminal number of
SFD1567	Limit terminal setting	the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number
		of the negative limit, and 0xFF is no terminal.
SFD1568	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y
SFD1569	Return speed VH low 16-bit	terminal, 0xFF is no terminal
SFD1572	Return speed VH high 16-bit	
SFD1573	Creeping speed VC low 16-bit	
SFD1574	Creeping speed VC high 16-bit	
SFD1575	Mechanical origin position low 16-bit	
SFD1576	Mechanical origin position high 16-bit	
SFD1577	Z phase number	
SFD1578	CLR signal delay time	Default is 20, unit: ms
QED1570	Grinding wheel radius (polar	
SFD1579	coordinates)	Low 16-bit
SFD1580		High 16-bit
SFD1581	Soft limit positive value	Low 16-bit
SFD1582		High 16-bit
SFD1583	Soft limit negative value	Low 16-bit
•••		
	Y5 (group 1 p	parameters)
SFD1600	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1601	Pulse default speed high 16-bit	speed is 0.
SFD1602	Acceleration time of pulse default speed	
SFD1603	deceleration time of pulse default speed	
SFD1604	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1605	Acceleration/deceleration mode	01: S curve acc/dec
SFD1003		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1606	Max speed low 16-bit	
SFD1607	Max speed high 16-bit	
SFD1608	Initial speed low 16-bit	
SFD1609	Initial speed high 16-bit	
0001(10		
SFD1610	Stop speed low 16-bit	

		$1 \sim 100, 100$ means the time constant is 1 Tick,
SFD1612	Follow performance	1 means the time constant is 100 Ticks
SFD1613	Follow feedforward compensation	0~100, %
	Y5 (group 2 p	parameters)
SFD1620	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1621	Pulse default speed high 16-bit	speed is 0.
	Acceleration time of pulse default	1
SFD1622	speed	
	deceleration time of pulse default	
SFD1623	speed	
SFD1624	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
		01: S curve acc/dec
SFD1625	Acceleration/deceleration mode	10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1626	Max speed low 16-bit	
SFD1627	Max speed high 16-bit	
SFD1628	Initial speed low 16-bit	
SFD1629	Initial speed high 16-bit	
SFD1630	Stop speed low 16-bit	
SFD1631	Stop speed high 16-bit	
		1~100, 100 means the time constant is 1 Tick,
SFD1632	Follow performance	1 means the time constant is 100 Ticks
SFD1633	Follow feedforward compensation	0~100, %
	Y5 (group 3 p	parameters)
SFD1640	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1641	Pulse default speed high 16-bit	speed is 0.
SED1642	Acceleration time of pulse default	
SFD1642	speed	
SFD1643	deceleration time of pulse default	
SFD1045	speed	
SFD1644	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1645	Acceleration/deceleration mode	01: S curve acc/dec
SFD1645		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1646	Max speed low 16-bit	

SFD1647	Max speed high 16-bit	
SFD1648	Initial speed low 16-bit	
SFD1649	Initial speed high 16-bit	
SFD1650	Stop speed low 16-bit	
SFD1651	Stop speed high 16-bit	
SFD1652	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1653	Follow feedforward compensation	0~100, %
	Y5 (group 4 p	parameters)
SFD1660	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1661	Pulse default speed high 16-bit	speed is 0.
SFD1662	Acceleration time of pulse default speed	
SFD1663	deceleration time of pulse default speed	
SFD1664	Accerlation and deceleration time	
SFD1665	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1666	Max speed low 16-bit	
SFD1667	Max speed high 16-bit	
SFD1668	Initial speed low 16-bit	
SFD1669	Initial speed high 16-bit	
SFD1670	Stop speed low 16-bit	
SFD1671	Stop speed high 16-bit	
SFD1672	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1673	Follow feedforward compensation	0~100, %
•••		
	Y6 (common)	parameters)
read and the second sec		

<u>г</u>		
		Bit 1: Pulse Direction Logic
		0: positive logic, 1: negative logic; default is 0
		Bit 2: Soft Limit
		0: Not enabled, 1: enabled; default is 0
		Bit 3: direction of mechanical return to origin
		0: Negative, 1: Positive; Default is 0
		Bit 10~8: Pulse Unit
		Bit 8: 0: Number of Pulses, 1:Equivalent
SFD1680	Pulse parameters	000: Number of pulses
		001: 1 μm
		011: 0.01 μm
		101: 0.1 μm
		111: 1 mm
		The default is 000.
		Bit15: Interpolated coordinate mode
		0: Cross coordinates, 1: Polar coordinates;
		The default is 0.
		Bit 0: pulse sending mode
SFD1681	Pulse sending mode	0: complete mode; 1: continue mode
		Default is 0
SFD1682	Pulse number/1 rotation low 16-bit	
SFD1683	Pulse number/1 rotation high 16-bit	
SFD1684	Moving amount/1 rotation low	
51 0 1004	16-bit	
SFD1685	Moving amount/1 rotation high	
51 01005	16-bit	
SFD1686	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1687	Direction delay time	Default is 20, unit: ms
SFD1688	Gear clearance positive	
51 5 1000	compensation	
SFD1689	Gear clearance negative	
51 0 1007	compensation	
SFD1690	Electrical origin position low 16-bit	
SFD1691	Electrical origin position high 16-bit	
		Bit0: Origin Signal Switch State Settings
		Bit1:Z Phase Switch State Settings
SFD1692	Signal terminal switch state	Bit2: Positive Limit Switching State Settings
51/01/092	Signal commar switch state	Bit3: Negative Limit Switching State Settings
		0: Normally open (positive logic), 1: Normally
		closed (negative logic); default is 0
SFD1694	Near-point signal terminal setting	
SFD1695	7 phase terminal setting	Bit0~Bit7: Specify the number of the X
	Z phase terminal setting	terminal, 0xFF is no terminal

		Bit7~Bit0: Specifies the X terminal number of
SFD1697	Limit terminal setting	the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number
		of the negative limit, and 0xFF is no terminal.
SFD1698	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y
SFD1699	Return speed VH low 16-bit	terminal, 0xFF is no terminal
SFD1702	Return speed VH high 16-bit	
SFD1703	Creeping speed VC low 16-bit	
SFD1704	Creeping speed VC high 16-bit	
SFD1705	Mechanical origin position low 16-bit	
SFD1706	Mechanical origin position high 16-bit	
SFD1707	Z phase number	
SFD1708	CLR signal delay time	Default is 20, unit: ms
	Grinding wheel radius (polar	
SFD1709	coordinates)	Low 16-bit
SFD1710		High 16-bit
SFD1711	Soft limit positive value	Low 16-bit
SFD1712		High 16-bit
SFD1713	Soft limit negative value	Low 16-bit
	Y6 (group 1 p	parameters)
SFD1730	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1731	Pulse default speed high 16-bit	speed is 0.
SFD1732	Acceleration time of pulse default speed	
SFD1733	deceleration time of pulse default speed	
SFD1734	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
0501725	Acceleration/deceleration mode	01: S curve acc/dec
SFD1735		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1736	Max speed low 16-bit	
SFD1737	Max speed high 16-bit	
SFD1738	Initial speed low 16-bit	
SFD1739	Initial speed high 16-bit	
SFD1740		
SFD1/40	Stop speed low 16-bit	

SFD1742	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks		
SFD1743	Fallow foodforward common sticn			
SFD1/45	Follow feedforward compensation	0~100, %		
···· V((group 2 poremeters)				
Y6 (group 2 parameters) SFD1750 Pulse default speed low 16-bit Pulse is sent at the default speed when the				
SFD1750 SFD1751	Pulse default speed low 16-bit Pulse default speed high 16-bit	Pulse is sent at the default speed when the speed is 0.		
SFD1/51	Acceleration time of pulse default	speed is 0.		
SFD1752	speed			
SFD1753	deceleration time of pulse default speed			
SFD1754	Accerlation and deceleration time			
SFD1755	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved		
SFD1756	Max speed low 16-bit			
SFD1757	Max speed high 16-bit			
SFD1758	Initial speed low 16-bit			
SFD1759	Initial speed high 16-bit			
SFD1760	Stop speed low 16-bit			
SFD1761	Stop speed high 16-bit			
SFD1762	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks		
SFD1763	Follow feedforward compensation	0~100, %		
	Y6 (group 3 p	parameters)		
SFD1770	Pulse default speed low 16-bit	Pulse is sent at the default speed when the		
SFD1771	Pulse default speed high 16-bit	speed is 0.		
SFD1772	Acceleration time of pulse default speed			
SFD1773	deceleration time of pulse default speed			
SFD1774	Accerlation and deceleration time			
SFD1775	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved		
SFD1776	Max speed low 16-bit			
L	i -	1		

SFD1777	Max speed high 16-bit				
SFD1778	Initial speed low 16-bit				
SFD1779	Initial speed high 16-bit				
SFD1780	Stop speed low 16-bit				
SFD1781	Stop speed high 16-bit				
SFD1782	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks			
SFD1783	Follow feedforward compensation	0~100, %			
Y6 (group 4 parameters)					
SFD1790	Pulse default speed low 16-bit	Pulse is sent at the default speed when the			
SFD1791	Pulse default speed high 16-bit	speed is 0.			
SFD1792	Acceleration time of pulse default speed				
SFD1793	deceleration time of pulse default speed				
SFD1794	Accerlation and deceleration time				
SFD1795	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved			
SFD1796	Max speed low 16-bit				
SFD1797	Max speed high 16-bit				
SFD1798	Initial speed low 16-bit				
SFD1799	Initial speed high 16-bit				
SFD1800	Stop speed low 16-bit				
SFD1801	Stop speed high 16-bit				
SFD1802	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks			
SFD1803	Follow feedforward compensation	0~100, %			
Y7 (common parameters)					

		Bit7~Bit0: Specifies the X terminal number of
SFD1827	Limit terminal setting	the positive limit, and 0xFF is no terminal. Bit15~Bit8: Specifies the X terminal number
SFD1828	Zero clear CLR output signal	of the negative limit, and 0xFF is no terminal. Bit0~Bit7: Specify the number of the Y
51/01/02/0		terminal, 0xFF is no terminal
SFD1829	Return speed VH low 16-bit	
SFD1832	Return speed VH high 16-bit	
SFD1833	Creeping speed VC low 16-bit	
SFD1834	Creeping speed VC high 16-bit	
SFD1835	Mechanical origin position low 16-bit	
SFD1836	Mechanical origin position high 16-bit	
SFD1837	Z phase number	
SFD1838	CLR signal delay time	Default is 20, unit: ms
	Grinding wheel radius (polar	
SFD1839	coordinates)	Low 16-bit
SFD1840		High 16-bit
SFD1841	Soft limit positive value	Low 16-bit
SFD1842		High 16-bit
SFD1843	Soft limit negative value	Low 16-bit
	Y7 (group 1 p	parameters)
SFD1860	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1861	Pulse default speed high 16-bit	speed is 0.
SFD1862	Acceleration time of pulse default speed	
SFD1863	deceleration time of pulse default speed	
SFD1864	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
		01: S curve acc/dec
SFD1865	Acceleration/deceleration mode	01: S curve acc/dec 10: sine curve acc/dec
SFD1865	Acceleration/deceleration mode	
SFD1865	Acceleration/deceleration mode	10: sine curve acc/dec
SFD1865 SFD1866	Acceleration/deceleration mode Max speed low 16-bit	10: sine curve acc/dec11: reserved
		10: sine curve acc/dec11: reserved
SFD1866	Max speed low 16-bit	10: sine curve acc/dec11: reserved
SFD1866 SFD1867	Max speed low 16-bit Max speed high 16-bit	10: sine curve acc/dec11: reserved
SFD1866 SFD1867 SFD1868	Max speed low 16-bit Max speed high 16-bit Initial speed low 16-bit	10: sine curve acc/dec11: reserved

		$1 \sim 100, 100$ means the time constant is 1 Tick,		
SFD1872	Follow performance	1 means the time constant is 100 Ticks		
SFD1873	Follow feedforward compensation	0~100, %		
	A			
Y7 (group 2 parameters)				
SFD1880	Pulse default speed low 16-bit	Pulse is sent at the default speed when the		
SFD1881	Pulse default speed high 16-bit	speed is 0.		
CED 100 2	Acceleration time of pulse default			
SFD1882	speed			
CED1002	deceleration time of pulse default			
SFD1883	speed			
SFD1884	Accerlation and deceleration time			
		Bit1~Bit0: acc/dec mode		
		00: linear acc/dec		
SFD1885	Acceleration/deceleration mode	01: S curve acc/dec		
5601005	Acceleration/deceleration mode	10: sine curve acc/dec		
		11: reserved		
		Bit15~Bit2: reserved		
SFD1886	Max speed low 16-bit			
SFD1887	Max speed high 16-bit			
SFD1888	Initial speed low 16-bit			
SFD1889	Initial speed high 16-bit			
SFD1890	Stop speed low 16-bit			
SFD1891	Stop speed high 16-bit			
SFD1892	Follow performance	$1\sim100$, 100 means the time constant is 1 Tick,		
51/010/2		1 means the time constant is 100 Ticks		
SFD1893	Follow feedforward compensation	0~100, %		
•••				
	Y7 (group 3 p	parameters)		
SFD1900	Pulse default speed low 16-bit	Pulse is sent at the default speed when the		
SFD1901	Pulse default speed high 16-bit	speed is 0.		
SFD1902	Acceleration time of pulse default speed			
	deceleration time of pulse default			
SFD1903	speed			
SFD1904	Accertation and deceleration time			
	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode		
		00: linear acc/dec		
		01: S curve acc/dec		
SFD1905		10: sine curve acc/dec		
		11: reserved		
		Bit15~Bit2: reserved		
SFD1906	Max speed low 16-bit			

SFD1907	Max speed high 16-bit			
SFD1908	Initial speed low 16-bit			
SFD1909	Initial speed high 16-bit			
SFD1910	Stop speed low 16-bit			
SFD1911	Stop speed high 16-bit			
SFD1912	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks		
SFD1913	Follow feedforward compensation	0~100, %		
	Y7 (group 4 p	parameters)		
SFD1920	Pulse default speed low 16-bit	Pulse is sent at the default speed when the		
SFD1921	Pulse default speed high 16-bit	speed is 0.		
SFD1922	Acceleration time of pulse default speed			
SFD1923	deceleration time of pulse default speed			
SFD1924	Accerlation and deceleration time			
SFD1925	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved		
SFD1926	Max speed low 16-bit			
SFD1927	Max speed high 16-bit			
SFD1928	Initial speed low 16-bit			
SFD1929	Initial speed high 16-bit			
SFD1930	Stop speed low 16-bit			
SFD1931	Stop speed high 16-bit			
SFD1932	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks		
SFD1933	Follow feedforward compensation	0~100, %		
•••				
	Y10 (common	parameters)		

			
		Bit 1: Pulse Direction Logic	
		0: positive logic, 1: negative logic; default is 0	
		Bit 2: Soft Limit	
		0: Not enabled, 1: enabled; default is 0	
		Bit 3: direction of mechanical return to origin	
		0: Negative, 1: Positive; Default is 0	
		Bit 10~8: Pulse Unit	
		Bit 8: 0: Number of Pulses, 1:Equivalent	
SFD1940	Pulse parameters	000: Number of pulses	
		001: 1 μm	
		011: 0.01 μm	
		101: 0.1 μm	
		111: 1 mm	
		The default is 000.	
		Bit15: Interpolated coordinate mode	
		0: Cross coordinates, 1: Polar coordinates;	
		The default is 0.	
	Pulse sending mode	Bit 0: pulse sending mode	
SFD1941		0: complete mode; 1: continue mode	
		Default is 0	
SFD1942	Pulse number/1 rotation low 16-bit		
SFD1943	Pulse number/1 rotation high 16-bit		
GED 1044	Moving amount/1 rotation low		
SFD1944	16-bit		
SED1045	Moving amount/1 rotation high		
SFD1945	16-bit		
SFD1946	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal	
SFD1947	Direction delay time	Default is 20, unit: ms	
CED1049	Gear clearance positive		
SFD1948	compensation		
CED 1040	Gear clearance negative		
SFD1949	compensation		
SFD1950	Electrical origin position low 16-bit		
SFD1951	Electrical origin position high 16-bit		
		Bit0: Origin Signal Switch State Settings	
SFD1952		Bit1:Z Phase Switch State Settings	
		Bit2: Positive Limit Switching State Settings	
	Signal terminal switch state	Bit3: Negative Limit Switching State Settings	
		0: Normally open (positive logic), 1: Normally	
		closed (negative logic); default is 0	
SFD1954	Near-point signal terminal setting		
		Bit0~Bit7: Specify the number of the X	
SFD1955	Z phase terminal setting	terminal, 0xFF is no terminal	
SFD1955	Z phase terminal setting		
		verminni, viti i io no terminnui	

SFD1957	Limit terminal setting	Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.
SFD1958	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y
SFD1959	Return speed VH low 16-bit	terminal, 0xFF is no terminal
SFD1962	Return speed VH high 16-bit	
SFD1963	Creeping speed VC low 16-bit	
SFD1964	Creeping speed VC high 16-bit	
SFD1965	Mechanical origin position low 16-bit	
SFD1966	Mechanical origin position high 16-bit	
SFD1967	Z phase number	
SFD1968	CLR signal delay time	Default is 20, unit: ms
SFD1969	Grinding wheel radius (polar coordinates)	Low 16-bit
SFD1970		High 16-bit
SFD1971	Soft limit positive value	Low 16-bit
SFD1972		High 16-bit
SFD1973	Soft limit negative value	Low 16-bit
	Y10 (group 1	parameters)
SFD1990	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1991	Pulse default speed high 16-bit	speed is 0.
SFD1992	Acceleration time of pulse default speed	
SFD1993	deceleration time of pulse default speed	
SFD1994	Accerlation and deceleration time	
SFD1995	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD1996	Max speed low 16-bit	
SFD1997	Max speed high 16-bit	
SFD1998	Initial speed low 16-bit	
SFD1999	Initial speed high 16-bit	
SFD2000	Stop speed low 16-bit	
SFD2001	Stop speed high 16-bit	

SFD2002 Follow performance 1=100, 100 means the time constant is 1 10E, 1 means the time constant is 100 Ticks SFD2003 Follow feedforward compensation 0=100, % 2 2 SFD2010 Pulse default speed low 16-bit Pulse is sent at the default speed when the speed is 0. SFD2011 Pulse default speed high 16-bit speed is 0. SFD2012 Acceleration time of pulse default speed Set of the speed is 0. SFD2013 Acceleration and deceleration time Bit1=Bit0: acc/dec mode 00: linear acc/dec 11: reserved SFD2014 Acceleration/deceleration mode Bit1=Bit0: acc/dec mode 00: linear acc/dec 11: reserved SFD2015 Acceleration/deceleration mode Bit1=Bit0: acc/dec 11: reserved SFD2016 Max speed high 16-bit Set of the speed Bit15=Bit2: reserved SFD2017 Max speed high 16-bit Set of the speed SFD2018 SFD2018 Initial speed high 16-bit Set of the speed SFD2020 StD20201 Stop speed high 16-bit Set of the speed SFD2021 SFD2015 Follow feedforward compensation SFD2021 Stop speed high 16-bit SFD2022 Follow performance 1=-100, 100 means the time constant is 1 00 Ticks SFD2031 Pulse default speed low 16-bit Pulse is sent at the default speed when the speed is 0. SFD2032 Follow fee			1 100 100			
SFD2003 Follow feedforward compensation 0-100, % V10 (group 2 parameters) SFD2010 Pulse default speed low 16-bit Pulse is sent at the default speed when the speed is 0. SFD2011 Acceleration time of pulse default speed high 16-bit speed SFD2011 Acceleration time of pulse default speed when time of pulse default speed Bit1-Bit0: acc/dec mode SFD2012 Acceleration and deceleration time Bit1-Bit0: acc/dec mode SFD2015 Acceleration/deceleration mode Bit1-Bit0: acc/dec SFD2016 Max speed low 16-bit I: reserved SFD2017 Max speed low 16-bit Bit1-Bit2: reserved SFD2018 Initial speed low 16-bit SFD2019 SFD2019 Initial speed low 16-bit SFD2010 SFD2010 Initial speed low 16-bit SFD2020 SFD2021 Stop speed logh 16-bit Imeans the time constant is 100 Ticks SFD2022 Follow performance 1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 1 Tick, 1 means the time constant is 1 OT Ticks SFD203 Pulse default speed logh 16-bit Pulse is sent at the default speed when the speed is 0. SFD203 Pulse default speed logh 16-bit Pulse is sent at the default speed when the speed is 0. SFD203 Acceleration time of pulse defa	SFD2002	Follow performance	$1 \sim 100$, 100 means the time constant is 1 Tick,			
Image: SFD2010 Pulse default speed low 16-bit Pulse is sent at the default speed when the speed is 0. SFD2011 Pulse default speed high 16-bit speed is 0. SFD2012 Acceleration time of pulse default speed is 0. speed SFD2013 deceleration time of pulse default speed high 16-bit speed SFD2014 Acceleration and deceleration time Bit1-Bit0: acc/dec mode SFD2015 Acceleration/deceleration mode Bit1-Bit0: acc/dec SFD2016 Max speed low 16-bit Bit1-Bit0: acc/dec SFD2017 Max speed low 16-bit Bit1-Bit0: acc/dec SFD2018 Initial speed low 16-bit Bit15-Bit2: reserved SFD2019 Initial speed low 16-bit SFD2019 SFD2010 Max speed high 16-bit SFD2019 SFD2012 Stop speed low 16-bit SFD2012 SFD2013 Stop speed high 16-bit SFD2012 SFD2014 Stop speed low 16-bit SFD2012 SFD2020 Stop speed high 16-bit SFD2012 SFD20217 Max speed high 16-bit SFD2023 SFD20203 Follow feedforward compenstation <t< td=""><td></td><td></td><td colspan="3"></td></t<>						
V10 (group 2 parameters) SFD2010 Pulse default speed low 16-bit Pulse is sent at the default speed when the speed is 0. SFD2011 Pulse default speed high 16-bit speed is 0. Acceleration time of pulse default speed deceleration time of pulse default speed SFD2013 deceleration time of pulse default speed model SFD2014 Acceleration and deceleration time Bit1-Bit0: acc/dec mode SFD2015 Acceleration/deceleration mode Bit1-Bit0: acc/dec 01: is curve acc/dec SFD2016 Max speed low 16-bit Bit1-Bit0: acc/dec 01: scurve acc/dec SFD2017 Max speed low 16-bit Bit15-Bit2: reserved Bit15-Bit2: reserved SFD2018 Initial speed high 16-bit SFD2019 Initial speed high 16-bit SFD2012 SFD2020 Stop speed high 16-bit SFD2020 Stop speed high 16-bit I-100, 100 means the time constant is 1 Tick, 1 means the time constant is 1 O Ticks SFD2021 Follow performance 1-100, 100 means the time constant is 1 O Ticks SFD2030 Pulse default speed low 16-bit Pulse is sent at the default speed when the speed is 0. SFD2031 Pulse default speed hi	SFD2003	Follow feedforward compensation	0~100, %			
SFD2010 Pulse default speed low 16-bit Pulse is sent at the default speed when the SFD2011 Pulse default speed high 16-bit speed is 0. SFD2013 Acceleration time of pulse default speed speed acceleration time of pulse default speed SFD2014 Accerlation and deceleration time SFD2015 Acceleration and deceleration time Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 10: sine curve acc/dec 10: sine curve acc/dec 11: reserved Bit15-Bit2: reserved SFD2016 Max speed low 16-bit SFD2017 Max speed low 16-bit SFD2018 Initial speed high 16-bit SFD2019 Initial speed high 16-bit SFD2010 Max speed low 16-bit SFD2012 Stop speed high 16-bit SFD202 Follow performance 1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 1 OT Ticks SFD2030 Pulse default speed high 16-bit SFD2031 Pulse default speed high 16-bit SFD2031 Follow feedforward compensation 0~100, % 0~100, % SFD2032 Pulse default speed high 16-bit SFD2033 Pulse default s						
SFD2011 Pulse default speed high 16-bit speed is 0. SFD2012 Acceleration time of pulse default speed	000010					
SFD2012 Acceleration time of pulse default speed SFD2013 deceleration time of pulse default speed SFD2014 Accerlation and deceleration time SFD2015 Acceleration/deceleration mode Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 10: sine curve acc/dec 11: reserved Bit15-Bit2: reserved SFD2016 Max speed low 16-bit Bit15-Bit2: reserved SFD2017 Max speed high 16-bit SFD2019 Initial speed high 16-bit Initial speed high 16-bit SFD2020 Stop speed low 16-bit Initial speed high 16-bit SFD2021 Stop speed low 16-bit Initial speed high 16-bit SFD2022 Follow performance 1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 1 0 Ticks SFD2023 Follow feedforward compensation 0~100, % V10 (group 3 parameters) SFD2031 Pulse default speed high 16-bit Pulse is sent at the default speed when the speed is 0. SFD2032 Follow referation time of pulse default speed speed Secleration time of pulse default speed is 0. SFD2033 Acceleration time of pulse default speed is 0. Acceleration time of pulse default speed is 0. SFD2034 Acceleration and deceleration time			- 1			
SFD2012 speed	SFD2011		speed is 0.			
SFD2013 speed SFD2014 Accertation and deceleration time SFD2015 Accelration and deceleration time SFD2015 Acceleration/deceleration mode Bit1~Bit0: acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit1~Bit0: acc/dec 11: reserved Bit1~Bit0: acc/dec 11: reserved Bit1~Bit0: acc/dec 11: reserved Bit1~Bit0: acc/dec SFD2016 Max speed high 16-bit SFD2017 Initial speed high 16-bit SFD2018 Initial speed high 16-bit SFD2020 Stop speed low 16-bit SFD2021 Stop speed high 16-bit SFD2022 Follow performance SFD2031 Follow feedforward compensation 0~100, % acceleration time of pulse default SFD2032 Pulse default speed high 16-bit SFD2033 Pulse default speed high 16-bit SFD2034 Acceleration time of pulse default speed	SFD2012	-				
SFD2015Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD2016Max speed low 16-bit	SFD2013	-				
SFD2015Acceleration/deceleration mode00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD2016Max speed low 16-bit	SFD2014	Accerlation and deceleration time				
SFD2017Max speed high 16-bitInitial speed high 16-bitSFD2018Initial speed high 16-bitSFD2020Stop speed low 16-bitSFD2020Stop speed low 16-bitI~100, 100 means the time constant is 1 Tick, 1 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2023Follow performanceI~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2023Follow feedforward compensation0~100, %V10 (group 3 parameters)SFD2030Pulse default speed high 16-bitPulse is sent at the default speed when the speed is 0.SFD2031Pulse default speed high 16-bitspeed is 0.SFD2032Acceleration time of pulse default speed is 0.deceleration time of pulse default speed is 0.SFD2033Accelration and deceleration timeBit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved	SFD2015	Acceleration/deceleration mode	00: linear acc/dec01: S curve acc/dec10: sine curve acc/dec11: reserved			
SFD2018Initial speed low 16-bitSFD2019Initial speed high 16-bitSFD2020Stop speed low 16-bitSFD2021Stop speed high 16-bitSFD2022Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2023Follow performance0~100, %Y10 (group 3 parameters)SFD2030Pulse default speed high 16-bitSFD2031Pulse default speed high 16-bitSFD2032Pulse default speed high 16-bitSFD2033Pulse default speed high 16-bitSFD2034Acceleration time of pulse default speedSFD2035Accelration time of pulse default speedSFD2034Accerlation and deceleration timeSFD2035Acceleration modeSFD2035Acceleration modeSFD2035Acceleration/deceleration modeSFD2035Acceleration/	SFD2016	Max speed low 16-bit				
SFD2019Initial speed high 16-bitSFD2020Stop speed low 16-bitSFD2021Stop speed high 16-bitSFD2022Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2023Follow feedforward compensation0~100, %	SFD2017	Max speed high 16-bit				
SFD2020Stop speed low 16-bitISFD2021Stop speed high 16-bit1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2022Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2023Follow feedforward compensation0~100, %Y10 (group 3 parameters)SFD2030Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD2031Pulse default speed high 16-bitspeed is 0.SFD2032Acceleration time of pulse default 	SFD2018	Initial speed low 16-bit				
SFD2021 Stop speed high 16-bit SFD2022 Follow performance 1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks SFD2023 Follow feedforward compensation 0~100, %	SFD2019	Initial speed high 16-bit	+			
SFD2022Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2023Follow feedforward compensation0~100, %0~100, %V10 (group 3 parameters)SFD2030Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD2031Pulse default speed high 16-bitspeed is 0.SFD2032Acceleration time of pulse default speed fault speedeffault speed fault speed for time of pulse default speed for time of pulse default speed for time of pulse default speedSFD2033deceleration time of pulse default speedfor time of pulse default speed for time of pulse default speedSFD2034Accerlation and deceleration timefor time of pulse default speedSFD2035Acceleration and deceleration timefor time acc/decSFD2035Acceleration/deceleration modefor time acc/dec01: S curve acc/dec10: sine curve acc/dec10: sine curve acc/dec11: reservedBit15~Bit2: reservedserved	SFD2020	Stop speed low 16-bit				
SFD2022Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD2023Follow feedforward compensation0~100, %0~100, %V10 (group 3 parameters)SFD2030Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD2031Pulse default speed high 16-bitspeed is 0.SFD2032Acceleration time of pulse default speed fault speedeffault speed fault speed for time of pulse default speed for time of pulse default speed for time of pulse default speedSFD2033deceleration time of pulse default speedfor time of pulse default speed for time of pulse default speedSFD2034Accerlation and deceleration timefor time of pulse default speedSFD2035Acceleration and deceleration timefor time acc/decSFD2035Acceleration/deceleration modefor time acc/dec01: S curve acc/dec10: sine curve acc/dec10: sine curve acc/dec11: reservedBit15~Bit2: reservedserved	SFD2021	Stop speed high 16-bit				
Image: Constraint of protect of protec	SFD2022	Follow performance				
Y10 (group 3 parameters) SFD2030 Pulse default speed low 16-bit Pulse is sent at the default speed when the speed is 0. SFD2031 Pulse default speed high 16-bit speed is 0. SFD2032 Acceleration time of pulse default speed fault speed when the speed is 0. SFD2032 deceleration time of pulse default speed fault speed SFD2033 deceleration time of pulse default speed SFD2034 Accerlation and deceleration time SFD2035 Acceleration/deceleration mode SFD2035 Acceleration/deceleration mode Bit1~Bit0: acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved Bit15~Bit2: reserved	SFD2023	Follow feedforward compensation	0~100, %			
SFD2030Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD2031Pulse default speed high 16-bitspeed is 0.SFD2032Acceleration time of pulse default speedacceleration time of pulse default speedSFD2033deceleration time of pulse default speedacceleration time of pulse default speedSFD2034Accerlation and deceleration timeBit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved	•••					
SFD2031 Pulse default speed high 16-bit speed is 0. SFD2032 Acceleration time of pulse default speed speed SFD2033 deceleration time of pulse default speed speed SFD2034 Accerlation and deceleration time speed SFD2035 Accerlation and deceleration time Bit1~Bit0: acc/dec mode SFD2035 Acceleration/deceleration mode 01: S curve acc/dec SFD2035 Acceleration/deceleration mode Bit1~Bit0: acc/dec SFD2035 Acceleration/deceleration mode Bit1~S curve acc/dec SFD2035 Acceleration/deceleration mode Bit1~S curve acc/dec SFD2035 Acceleration/deceleration mode Bit1-S Bit2: reserved		Y10 (group 3	parameters)			
SFD2032 Acceleration time of pulse default speed SFD2033 deceleration time of pulse default speed SFD2034 Accerlation and deceleration time SFD2035 Accerlation and deceleration time SFD2036 Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved Bit15~Bit2: reserved	SFD2030	Pulse default speed low 16-bit	Pulse is sent at the default speed when the			
SFD2032 speed SFD2033 deceleration time of pulse default speed SFD2034 Accerlation and deceleration time SFD2035 Accerlation and deceleration time Bit1~Bit0: acc/dec mode 00: linear acc/dec 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved Bit15~Bit2: reserved	SFD2031	Pulse default speed high 16-bit	speed is 0.			
SFD2033 speed SFD2034 Accerlation and deceleration time SFD2035 Bit1~Bit0: acc/dec mode Acceleration/deceleration mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved	SFD2032	*				
SFD2035 Bit1~Bit0: acc/dec mode Acceleration/deceleration mode 00: linear acc/dec 10: sine curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved	SFD2033	-				
SFD2035 Acceleration/deceleration mode 00: linear acc/dec 01: S curve acc/dec 01: sine curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved Bit15~Bit2: reserved	SFD2034	Accerlation and deceleration time				
	SFD2035	Acceleration/deceleration mode	00: linear acc/dec01: S curve acc/dec10: sine curve acc/dec11: reserved			
	SFD2036	Max speed low 16-bit				

SFD2037Max speed high 16-bitSFD2038Initial speed low 16-bitSFD2039Initial speed high 16-bit	
SFD2039 Initial speed high 16-bit	
ST D 2009 Initial Speed High To Old	
SFD2040 Stop speed low 16-bit	
SFD2041 Stop speed high 16-bit	
SFD2042 Follow performance	ns the time constant is 1 Tick, e constant is 100 Ticks
SFD2043Follow feedforward compensation0~100, %	
Y10 (group 4 parameters)	
SFD2050 Pulse default speed low 16-bit Pulse is sent at	t the default speed when the
SFD2051 Pulse default speed high 16-bit speed is 0.	
SFD2052 Acceleration time of pulse default speed	
SFD2053 deceleration time of pulse default speed	
SFD2054 Accerlation and deceleration time	
SFD2055Acceleration/deceleration modeBit1~Bit0: acc/ 00: linear 01: S curv 10: sine cu 11: reserv Bit15~Bit2: res	acc/dec re acc/dec urve acc/dec ed
SFD2056 Max speed low 16-bit	
SFD2057 Max speed high 16-bit	
SFD2058 Initial speed low 16-bit	
SFD2059 Initial speed high 16-bit	
SFD2060 Stop speed low 16-bit	
SFD2061 Stop speed high 16-bit	
SFD2062 Follow performance	ns the time constant is 1 Tick, e constant is 100 Ticks
SFD2063 Follow feedforward compensation 0~100, %	
Y11 (common parameters)	

Bit 1: Pulse Direction Logic			
	Bit 1: Pulse Direction Logic		
0: positive logic, 1: negative lo	gic; default is 0		
Bit 2: Soft Limit			
0: Not enabled, 1: enabled; def			
Bit 3: direction of mechanical	-		
0: Negative, 1: Positive; Defau	lt 18 0		
Bit 10~8: Pulse Unit			
Bit 8: 0: Number of Pulses, 1:E	Equivalent		
SFD2070 Pulse parameters 000: Number of pulses			
001: 1 µm			
011: 0.01 µm			
101: 0.1 µm			
111: 1 mm			
The default is 000.			
Bit15: Interpolated coordinate			
0: Cross coordinates, 1: Polar c	coordinates;		
The default is 0.			
Bit 0: pulse sending mode			
SFD2071 Pulse sending mode 0: complete mode; 1: contin	nue mode		
	Default is 0		
SFD2072 Pulse number/1 rotation low 16-bit			
SFD2073 Pulse number/1 rotation high 16-bit			
SFD2074 Moving amount/1 rotation low 16-bit			
SFD2075 Moving amount/1 rotation high 16-bit			
SFD2076 Pulse direction terminal Appoint to Y terminal, 0xFF is	no terminal		
SFD2077 Direction delay time Default is 20, unit: ms			
Gear clearance positive			
SFD2078 compensation			
GER clearance negative			
SFD2079 compensation			
SFD2080 Electrical origin position low 16-bit			
SFD2081 Electrical origin position high 16-bit			
Bit0: Origin Signal Switch Stat	te Settings		
Bit1:Z Phase Switch State Sett	ings		
Bit2: Positive Limit Switching	State Settings		
SFD2082Signal terminal switch stateBit3: Negative Limit Switching	g State Settings		
0: Normally open (positive log	ic), 1: Normally		
closed (negative logic); default	t is 0		
SFD2084 Near-point signal terminal setting			
1 8 8			
SFD2085 Z phase terminal setting Bit0~Bit7: Specify the num	mber of the X		

[Dit7 Dit0 Specifies the V terminal number of	
SFD2087	Limit terminal setting	Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.	
SFD2088	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y	
SFD2089	Return speed VH low 16-bit	terminal, 0xFF is no terminal	
SFD2092	Return speed VH high 16-bit		
SFD2093	Creeping speed VC low 16-bit		
SFD2094	Creeping speed VC high 16-bit		
SFD2095	Mechanical origin position low 16-bit		
SFD2096	Mechanical origin position high 16-bit		
SFD2097	Z phase number		
SFD2098	CLR signal delay time	Default is 20, unit: ms	
SFD2099	Grinding wheel radius (polar coordinates)	Low 16-bit	
SFD2100		High 16-bit	
SFD2101	Soft limit positive value	Low 16-bit	
SFD2102	1 1	High 16-bit	
SFD2103	Soft limit negative value	Low 16-bit	
	Y11 (group 1	parameters)	
SFD2120	Pulse default speed low 16-bit	Pulse is sent at the default speed when the	
SFD2121	Pulse default speed high 16-bit	speed is 0.	
SFD2122	Acceleration time of pulse default speed		
SFD2123	deceleration time of pulse default speed		
SFD2124	Accerlation and deceleration time		
		Bit1~Bit0: acc/dec mode	
		00: linear acc/dec	
SFD2125		01: S curve acc/dec	
SFD2125	Acceleration/deceleration mode	10: sine curve acc/dec	
		11: reserved	
		Bit15~Bit2: reserved	
SFD2126	Max speed low 16-bit		
SFD2127	Max speed high 16-bit		
SFD2128	Initial speed low 16-bit		
SFD2129	Initial speed high 16-bit		
SFD2130	Stop speed low 16-bit		

		1, 100, 100 means the time constant is 1 Tick			
SFD2132	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks			
SFD2133	Follow foodforward componentian				
	Follow feedforward compensation	0~100, %			
··· Y11 (group 2 parameters)					
SFD2140	Pulse default speed low 16-bit	Pulse is sent at the default speed when the			
SFD2140	Pulse default speed high 16-bit	speed is 0.			
5112141	Acceleration time of pulse default				
SFD2142	speed				
SFD2143	deceleration time of pulse default speed				
SFD2144	Accerlation and deceleration time				
SFD2145	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved			
SFD2146	Max speed low 16-bit				
SFD2147	Max speed high 16-bit				
SFD2148	Initial speed low 16-bit				
SFD2149	Initial speed high 16-bit	-			
SFD2150	Stop speed low 16-bit				
SFD2151	Stop speed high 16-bit				
SFD2152	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks			
SFD2153	Follow feedforward compensation	0~100, %			
	Y11 (group 3)	parameters)			
SFD2160	Pulse default speed low 16-bit	Pulse is sent at the default speed when the			
SFD2161	Pulse default speed high 16-bit	speed is 0.			
SFD2162	Acceleration time of pulse default speed				
SFD2163	deceleration time of pulse default speed				
SFD2164	Accerlation and deceleration time				
SFD2165	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved			
SFD2166	Max speed low 16-bit				
		I			

SFD2167	Max speed high 16-bit	
SFD2168	Initial speed low 16-bit	
SFD2169	Initial speed high 16-bit	
SFD2170	Stop speed low 16-bit	
SFD2171	Stop speed high 16-bit	
SFD2172	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD2173	Follow feedforward compensation	0~100, %
	Y11 (group 4	parameters)
SFD2180	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD2181	Pulse default speed high 16-bit	speed is 0.
SFD2182	Acceleration time of pulse default speed	
SFD2183	deceleration time of pulse default speed	
SFD2184	Accerlation and deceleration time	
SFD2185	Acceleration/deceleration mode	Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reserved
SFD2186	Max speed low 16-bit	
SFD2187	Max speed high 16-bit	
SFD2188	Initial speed low 16-bit	
SFD2189	Initial speed high 16-bit	
SFD2190	Stop speed low 16-bit	
SFD2191	Stop speed high 16-bit	
SFD2192	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD2193	Follow feedforward compensation	0~100, %
•••		

Appendix 4. External interruption terminal list

XD series PLC external interrupt terminal allocation is as follows: **XD/XL series 10 I/O**

Input terminal	Pointer		Disable
	Rising interruption	Falling interruption	interruption
			instruction
X2	10000	I0001	SM050
X3	I0100	I0101	SM051
X4	I0200	I0201	SM052

XD/XL series 16 I/O

	Pointer		Disable
Input terminal	Rising interruption	Falling interruption	interruption instruction
X2	10000	I0001	SM050
X3	I0100	I0101	SM051
X4	10200	I0201	SM052
X5	I0300	I0301	SM053
X6	I0400	I0401	SM054
X7	10500	I0501	SM055

XD/XL series 24~64 I/O

	Pointer		Disable
Input terminal	Rising interruption	Falling interruption	interruption
	Kising interruption	Faming interruption	instruction
X2	10000	I0001	SM050
X3	I0100	I0101	SM051
X4	I0200	I0201	SM052
X5	I0300	I0301	SM053
X6	I0400	I0401	SM054
X7	I0500	I0501	SM055
X10	I0600	I0601	SM056
X11	I0700	I0701	SM057
X12	I0800	I0801	SM058
X13	I0900	I0901	SM059

Appendix 5. PLC resource conflict table

When PLC is used in practice, conflicts may arise due to the simultaneous use of some resources. This section will list the resources that may cause conflicts in each PLC model. This part mainly refers to high-speed counting, accurate timing and pulse output.

	Precise		High spe	Pulse					
VD2 1	timing	05-16, XL3-16, XL5-16, XL5E-16							
AD2-1	<u>о, дрз-10, др</u> ЕТО			ALJE-10					
	ET0 ET2	-	-	-	-	-	-		
	ET2 ET4								
	ET4 ET6								
	ET8	HSC0							
	ET10	IISCU	HSC2						
	ET10 ET12		11502	HSC4					
	ET12 ET14			11504		Y0			
	ET14 ET16					Y0			
	ET18					Y1			
	ET18 ET20					Y1			
	ET20 ET22					Υ I			
	ET22 ET24								
VD2 2		12 20							
AD3-2	4/32/48/60, ZC ET0	13-30							
	ET0 ET2								
	ET2 ET4								
	ET4 ET6								
	ET8								
	E18 ET10								
		USCO							
	ET12	HSC0	116/22						
	ET14		HSC2						
	ET16			HSC4		VO			
	ET18					Y0			
	ET20					Y0			
	ET22					Y1			
VDC 0	ET24					Y1			
XD5-2	4/32/48/60, XI		8/00, XD3E-3	0/60, XDME	2-00, AL5-32,		LIVIE-32		
	ET0	-	-	-	-	-	-		
	ET2			110.04	HSC6		<u> </u>		
	ET4		110.02	HSC4					
	ET6	110.00	HSC2						
	ET8	HSC0							

			170	
			Y3	
			Y3	
			Y2	
			Y2	
			Y1	
			Y1	
			Y0	
			Y0	
-	-	HSC6	-	-
	HSC4			
HSC2				
			Y3	
			Y3	
			Y2	
			Y2	
			Y1	
			Y1	
			Y0	
			Y0	
		HSC4	HSC4	Y2 Y2 Y1 Y1 Y1 Y1 Y0 Y1 Y1

 \times 1: This form should be read horizontally. Any two resources in each row cannot be used at the same time. Otherwise, it will cause conflict.



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