



User manual [positioning control]

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Preface

XG series PLC

User manual

[Positioning control]

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Version 1

• Basic explanation

Thank you for purchasing Xinje XG series PLC.

This manual mainly introduces XG 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.

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Preface

---- Positioning control

This manual is XG series PLC positioning control manual, it introduces pulse output and motion control function, is suitable for XG1, XG2 series PLC.

1. XG series PLC features:

> Faster instruction processing speed

XG1 series PLC instruction processing speed is 2~3 times faster than XD series, XG2 series PLC instruction processing speed is 3~5 times faster than XDM series. The key performance is that the operation speed of floating-point instructions is significantly improved, and the scanning cycle unit is us.

Larger program capacity

XG series PLC has larger program capacity than XD series. XG1 series has 1MB program capacity, and XG2 series has 16MB program capacity.

> Up to 16 modules can be extended

XG series PLC supports the expansion of modules, including digital value, analog value, temperature module, etc., and the maximum number of expansion modules is 16.

> Compatible with XC series program

XG 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.

> Compatible most functions of XD series PLC

In addition to the above advantages, XG series also supports most common functions of XD series PLC.

> X-NET fieldbus

XG1 PLC supports X-NET fieldbus. It can realize fast and stable communication between XG/XD/XL series PLC and TG/TN series touch screen.

Ethernet communication

The built-in Ethernet port LAN1 (RJ45 standard) can stably and quickly realize program upload and download, online monitoring and remote monitoring. After connecting to the LAN, it can communicate with other TCP IP devices in the LAN.

EtherCAT bus

XG2 series also has built-in Ethernet port LAN2 (RJ45 standard), which supports EtherCAT bus communication. At present, V1 version supports 32 maximum stations. At present, it only supports slave stations with EEPROM, such as Xinje-DS5C, Panasonic EtherCAT servo, Kollmorgen servo, etc., but does not support Inovance servo.

2. Product models

2.	I fouuet mo	
	Series	Model
	XG1	XG1-16T4
	XG2	XG2-26T4

3. Version requirements

XG series PLC requires the PLC software version v3.5.2 and up.

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	$\square \square $	1-2-5		
ZRN	Mechanical return zero	ZRN S0 D	1-2-6		
STOP	Stop pulse	STOP S0 S1	1-2-7		
GOON	Continue to output pulse	GOON Yn	1-2-8		

1-1. Function overview

XG1 and XG2 series PLC have 4-channel pulse output. By using different command programming methods, it can carry out one-way pulse output without acceleration / deceleration, one-way pulse output with acceleration / deceleration, multi-stage, forward and reverse output, etc., and the output frequency can be up to 100kHz.

Note: For XG series PLC, since the precondition is edge trigger, there is no pulse double coil problem.

PLC model	Pulse channels	Pulse output terminal	Max output frequency	Output mode	Output format
XG1-16T4	4 axes	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XG2-26T4	4 axes	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction

Pulse output terminal:

Note:

%1: PLC can output up to 200KHz pulses, but not all the servos can work well, please connect 500 Ω resistor between output and 24V power supply.

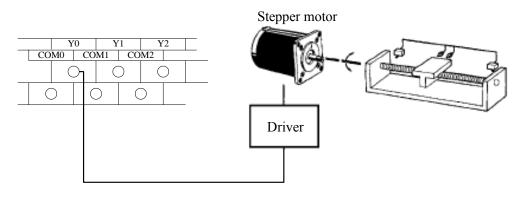
 \approx 2: the direction terminal can be set to any terminal except pulse output terminal when using positioning instruction.

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

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

Load current

When using the command related to positioning for the pulse output port of the basic unit (transistor output type), please adjust the load current output by the open collector transistor to 10 \sim 100mA (DC5 \sim 24V).



Note:

^{%1:} 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.

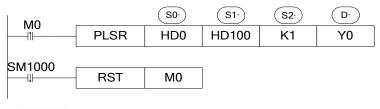
- *2: the pulse output terminal LED will slight light when the pulse is outputting. Because the pulse is 50% empty square wave, so the LED will light in half of the period and off in another half of period.
- ※3: the pulse output terminal Yn will be ON in software when the pulse is outputting, and it will be OFF when the pulse output finished.

1-2. Pulse output type and instruction application

1-2-1. Pulse parameter and configuration

XG 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 in the software or right click the PLSR instruction in the program to open the configuration window of PLSR.

			multi sec	tion pulse output		
data	a start ad	SO Idress: HD0 user p	arams address:	S1 S2 HD100 system params: K1	output: Y0	
mod	le:	relative ❤ start e	xecute section count:	0 Config		
Ad	dd Del	ete Upwards Downwar	ds	· · · ·		
		frequence	pulse count	wait condition	wait register	jump register
►	1	1000	1000	ACT time	K300	КЗ
	2	2000	3000	wait signal	M10	K1
	3	2000	-3000	pulse sending complete	KO	K2
used	space:	HD0-HD39,HD100-HD103	3	Read From PLC Write 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] ~ [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	
	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	
	H05: EXT signal or pulse output finished	
S0+14	Low 8-bit: 【wait condition register type】 (use together	Segment 1
	with [wait condition])	Segment I
	H00: constant	
	H01: D	
	H02: HD	
	H03: FD	
	H04: X	
	H05: M	
	H06: HM	
	[constant/register number (wait condition)], use	
S0+15 (double words)	together with [wait condition], [wait condition register	
	type 】	

• Data starting address S0

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	Comment M
S0+N*10+5 (double words)	Constant or register number (wait condition)	Segment N
S0+N*10+7	Jump register type	
S0+N*10+8 (double words)	Constant or register number (jump register)	

Note:

- %1: pulse frequency is positive value (\ge 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.

a. 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.

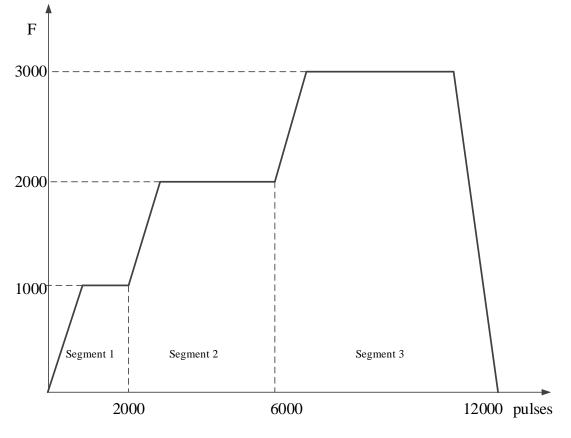
Example 1:

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:

data start address: HD0 user params address mode: relative \vee start execute section		data start address:		r params address:	HD100	system params:	K1	output:	YO	
		t execute section count:	tion count: 0 Config							
Add D	elete Upwa	ards Down	wards							
	fre	quence	pulse count	wait condition			wait jump register registe			
1	1	000	2000	թվ	pulse sending complete		K)	KO	
2	2	000	4000	թվ	pulse sending complete		К)	KO	
▶ 3	3	000	6000	թվ	se sending comp.	lete	K)	KO	

Multi-segment pulse configuration



Multi-segment sequence control pulse wave

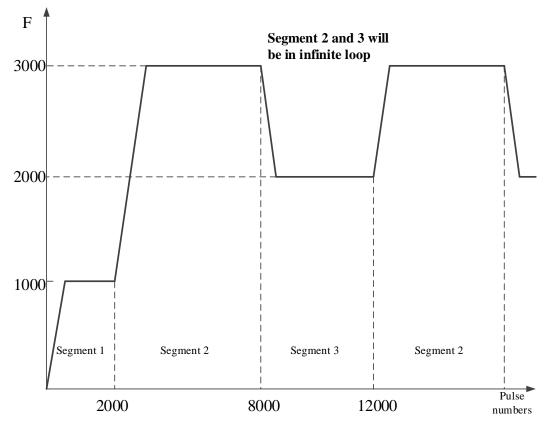
Example 2:

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 star	t address:	HD0	user params address	s: HD100	system params:	K1	output:	YO	
node:		relative 🗸	start execute section	n count: 0	Config				
Add	Delete l	Jpwards Do	ownwards						
		frequence	pulse	count	wait condition		wa regi	it ster	jump register
1		1000	200	0 թա	lse sending comp	plete	Ю	D	КЗ
2		2000	400	0 pu	lse sending comp	plete	К	D	KO
▶ 3		3000	600	0 թա	lse sending comp	plete	ĸ	D	K2

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.

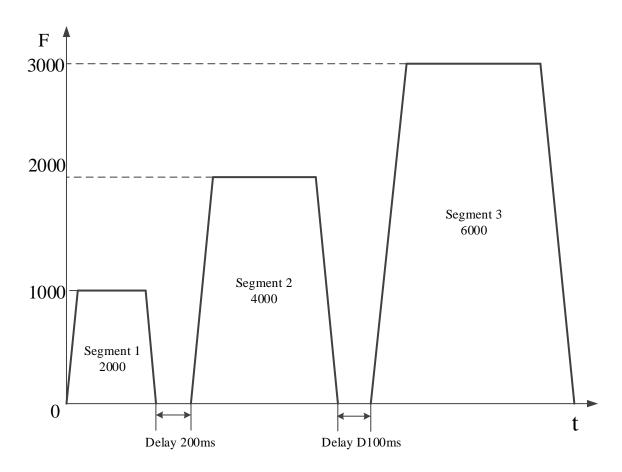
For example:

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:

data start ado mode:	dress: HD0 relative v	start execute section count:	HD100 system params: 0 Config	К1	output:	YO	
Add Dele	ete Upwards De	pwnwards				1	
	frequence	pulse count	wait condition		wa regi		jump register
1	1000	2000	wait time		K20	00	KO
2	2000	4000	wait time		D10	00	KO
▶ 3	3000	6000	pulse sending comple	ete	KO)	KO

Multi-segment pulse 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: 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.

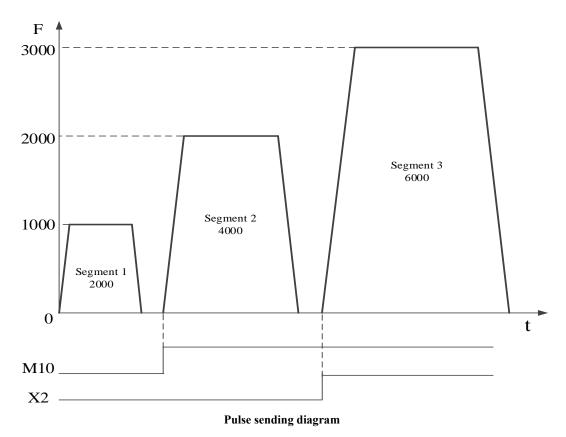
For example:

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:

data start	address:	DO	user par	ams address:	D100	system params:	K1	output:	Y0	
node:		relative v	start exe	cute section count:	0	Config				
Add D	elete U	Ipwards Do	ownward	5		·				
		frequence		pulse count		wait condition		wa regi		jump register
1		1000		2000		wait signal		M1	0	KO
2		2000		4000		wait signal		X2	2	KO
▶ 3		3000		6000	pu	lse sending comp	lete	K)	KO

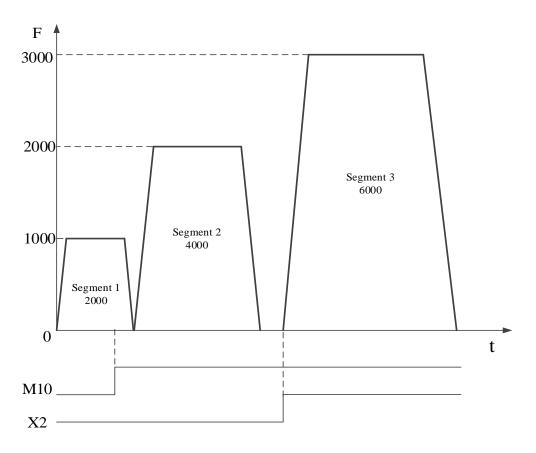
Multi-segment pulse output configuration table



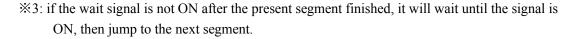
Note:

%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



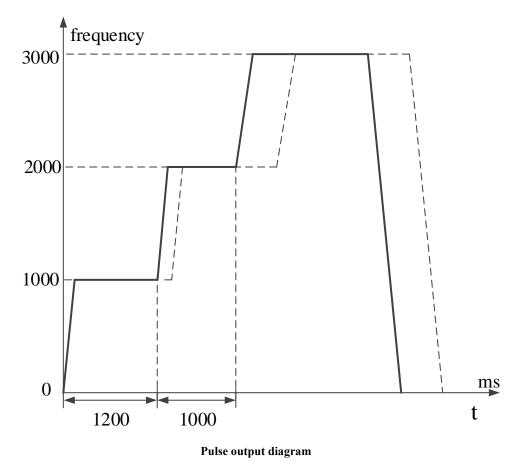
• ACT time (H03)

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:

uala slar	t address:	HD0 u	ser params address:	HD100 system params: K1	output: Y0	
mode:		relative 🗸 s	tart execute section count:	0 Config		
Add	Delete l	Jpwards Dow	nwards			
		frequence	pulse count	wait condition	wait register	jump register
1		1000	2000	ACT time	K1200	KO
2		2000	4000	ACT time	D100	KO
▶ 3		3000	6000	pulse sending complete	КО	KO

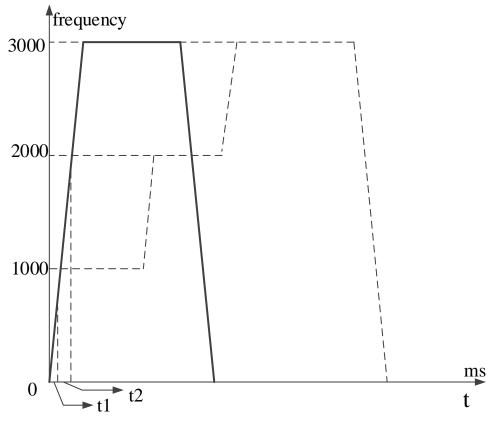
Multi-segment pulse output configuration



Note:

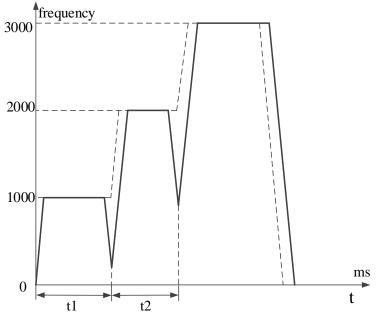
1: the acceleration time and deceleration time can be set in the parameter table, it will be explained in system parameters.

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.



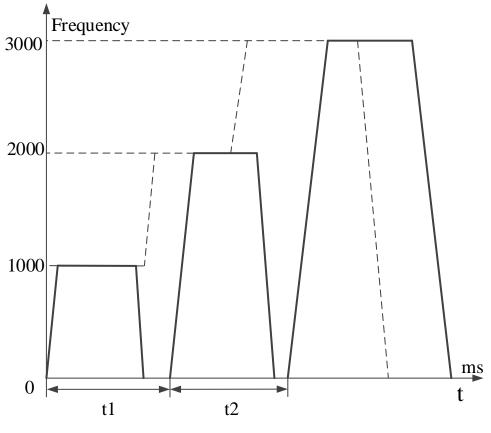
Pulse output diagram

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)

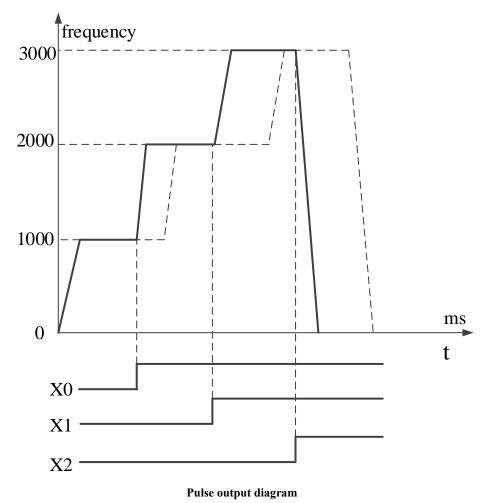
When the pulse is outputting (the pulse numbers have not been sent yet), if external signal is ON, it will jump to the next appointed segment. If the external signal has no action when the present pulse segment ends, it will wait for this signal. The external signal will input from X terminal (the response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

	address:	HD0	user params address:	HD100 system params:	K1	output: Y	/0
mode:		relative 🗸	start execute section count:	0 Config			
Add	Delete l	Jpwards Do	wnwards				
		frequence	pulse count	wait condition		wait regist	
1		1000	2000	EXT signal		хо	KO
2		2000	4000	EXT signal		X1	KO
▶ з		3000	6000	EXT signal		Х2	KO

Multi-segment pulse output configuration

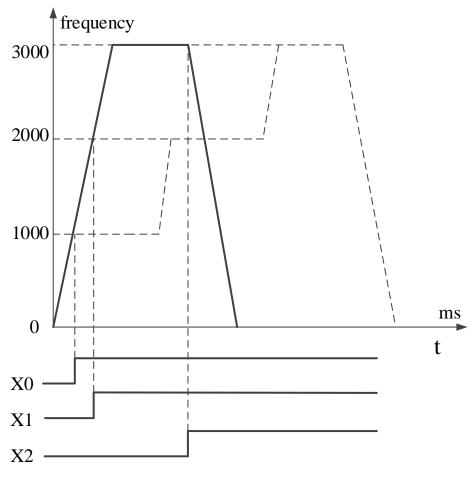


Note:

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

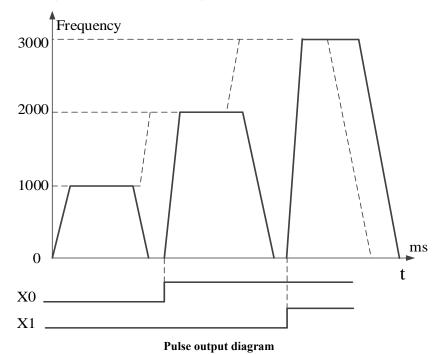
2: the pulse is accelerating when the EXT signal is triggered, it will accelerate from the present position to pulse segment 2. The same, it will accelerate from the present position of EXT singal

triggered to segment 3. As shown of below diagram:

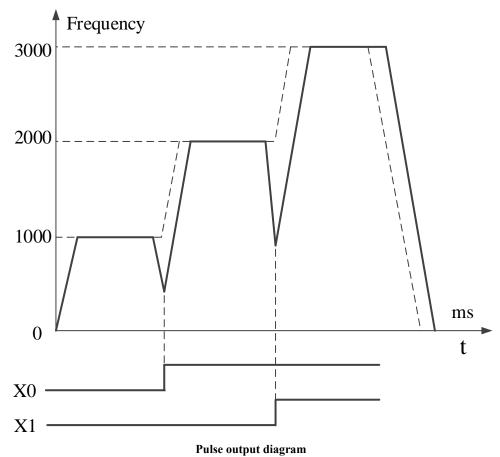


Pulse output diagram

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.



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:

lata	a start addr		user params address:	HD100 system params:	K1	output:	YO	
nod	le:	relative 🗸	start execute section count:	0 Config				
Ad	dd Delet	e Upwards Do	ownwards					
_		frequence	pulse count	wait condition		wa regi		jump register
	1	1000	2000	EXT signal/pulse sendi	ng com	XC)	KO
	2	2000	4000	EXT signal/pulse sendi	ng com	X	1	KO
•	3	3000	6000	EXT signal/pulse sendi	ng com	X2	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).

b. 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.

c. 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	L	1000	2000	pulse sending complete	KO	KO
2	2	2000	6000	pulse sending complete	KO	KO
▶ 3	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 v	start execute section count:	0	Config			

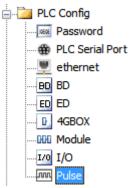
Click "config" button to enter system parameters.

		PLC1 - Pulse Set		×	
i C	onfig 🗕 Delete 🛛 i	init axis config guide			
	 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		
YO :	YO axis-Common-Delayed time of pulse direction (ms) 10				
YO :	YO axis-Common-Gear clearance positive compensation 0 🗸				
Read From 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	13
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)		
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	Config 👻 Delete 🛛 init axis 🔷 config gu	ide		
PLC Serial Port	✓ Y0 axis	Value	^	
	Y Y1 axis eters setting Pul	se direction logic positive logic		
ED ED	Y Y2 axis eters setting-enal	ble soft limit disable		
- D. 4GBOX	y Y3 axis eters setting med	hanical back to negative		
IVO I/O	Y Y4 axis eters setting Pul	se unit pulse number		
Pulse	Y Y5 axis eters setting Int	erpolation 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 termin	al Y no terminal		
	YO axis-Common-Delayed time of pulse	direction (ms) 10		
	YO axis-Common-Gear clearance positiv	e compensation 0	\sim	
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 5 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		
	Y0 (common pa	rameters)		
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 Bit4: motor operation mode (closed loop pulse) 0: position mode 1: pulse mode, 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 Bit13: pulse type 0: single direction pulse 1: AB phase pulse (only for XD5-48D4T4-E), default is 0 Bit15: interpolation coordinate mode 0: cross coordinate, 1: polar coordinate, default is 0		
SFD901	Pulse output mode	Bit0: pulse output mode 0: completion mode, 1: subsequent mode Default is 0		
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	
51 0 70 7	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
		Bit2: positive limit ON/OFF state
SFD912	Signal terminal state setting	Bit3: negative limit ON/OFF state
		0: normally ON(positive logic), 1:
		normally close(negative logic), default is
		0
SFD913	Origin signal terminal setting	
SFD914	Z phase terminal setting	Bit0~Bit7: X terminal number, 0xFF is no
510914	Z phase terminal setting	terminal
		Bit7~Bit0: positive limit X terminal
SFD915	Limit terminal setting	number, 0xFF is no terminal
51 D 91 5		Bit15~Bit8: negative limit X terminal
		number, 0xFF is no terminal
SFD917	Zero clear CLR signal output	Bit0~Bit7: Y terminal number, 0xFF is no
51/0917	terminal setting	terminal
SFD918	Return speed VH low 16-bit	
SFD919	Return speed VH high 16-bit	
SFD922	Crawling speed VC low 16-bit	
SFD923	Crawling speed VC high 16-bit	
SFD924	Mechanical origin low 16-bit	
SFD925	Mechanical origin high 16-bit	
SFD926	Z phase numbers	
SFD927	CLR signal delay time	Default is 20, unit: ms
SFD928	Wheel radius (relar searchingte)	Low 16-bit
SFD929	Wheel radius (polar coordinate)	High 16-bit
SFD930	Soft limit positive pole value	Low 16-bit
SFD931	Soft mint positive pole value	High 16-bit
SFD932	Soft limit regative rale value	Low 16-bit
SFD933	Soft limit negative pole value	High 16-bit
SFD934	Encoder pulse number/1 rotate	Low 16-bit
SFD935	(closed-loop pulse)	High 16-bit
SFD936	Encoder offset/1 rotate	Low 16-bit
SFD937	(closed-loop pulse)	High 16-bit
CED020	Width of complete orientation	
SFD938	(closed-loop pulse)	
CED020	Limit of deviation position	
SFD939	(closed-loop pulse)	

SFD940	Motor rated speed (closed-loop pulse)	
SFD941	Rated speed corresponding frequency (100Hz) (closed loop pulse)	
SFD942	Positioning completion time limit (ms) (closed loop pulse)	
SFD943	Motion control default parameter block	Bit0~bit7:fast positioning instructiondefault parameter block0~4, default is 1Bit8~bit15:interpolation instructiondefault parameter block0~4, default is 2
	Y0 (group0 par	rameters)
HSD460	Pulse default speed low 16-bit	It will output pulse with default speed
HSD461	Pulse default speed high 16-bit	when the speed is 0
HSD462	Pulse default speed acceleration time	
HSD463	Pulse default speed deceleration time	
HSD464	Gear clearance acc/dec time	
HSD465	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
HSD466	Max speed limit low 16-bit	-
HSD467	Max speed limit high 16-bit	
HSD468	Start speed low 16-bit	
HSD469	Start speed high 16-bit	
HSD470	End speed low 16-bit	
HSD471	End speed high 16-bit	
HSD472	Follow performance parameter	$1\sim100$, 100 means the time constant is one tick, 1 means the time constant is 100 ticks.
HSD473	Follow feedforward compensation	
	parameter	0~100, percentage
HSD474	Pulse frequency refresh time	1ms, 0.1ms
HSD475		Low 16-bit
HSD476	ZRN regression velocity VH	High 16-bit
HSD477	ZRN crawl speed VC	Low 16-bit

HSD478		High 16-bit
	Y0 (group1 par	rameters)
SFD950	Pulse default speed low 16-bit	It will output pulse with default speed
SFD951	Pulse default speed high 16-bit	when the speed is 0
SFD952	Pulse default speed acceleration time	
SFD953	Pulse default speed deceleration time	
SFD954	Gear clearance acc/dec time	
SFD955	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
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	
SFD962	Follow performance parameter	$1 \sim 100$, 100 means the time constant is one tick, 1 means the time constant is 100 ticks.
SFD963	Follow feedforward compensation parameter	0~100, percentage
SFD964	Pulse frequency refresh time	1ms, 0.1ms
SFD965	7DN regranding value it. MI	Low 16-bit
SFD966	ZRN regression velocity VH	High 16-bit
SFD967	ZDN aroust around VC	Low 16-bit
SFD968	ZRN crawl speed VC	High 16-bit
	Y0 (group2 par	rameters)
SFD970	Pulse default speed low 16-bit	It will output pulse with default speed
SFD971	Pulse default speed high 16-bit	when the speed is 0
SFD972	Pulse default speed acceleration time	
SFD973	Pulse default speed deceleration time	
SFD974	Gear clearance acc/dec time	

		214 210 44
	Acceleration deceleration mode	Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD975		01: S curve acc/dec
		10: sine curve acc/dec
		11: reserved
		Bit15~ Bit2: reserved
SFD976	Max speed limit low 16-bit	
SFD977	Max speed limit high 16-bit	
SFD978	Start speed low 16-bit	
SFD979	Start speed high 16-bit	
SFD980	End speed low 16-bit	
SFD981	End speed high 16-bit	
		1~100, 100 means the time constant is
SFD982	Follow performance parameter	one tick, 1 means the time constant is 100
		ticks.
CED002	Follow feedforward compensation	
SFD983	parameter	0~100, percentage
SFD984	Pulse frequency refresh time	1ms, 0.1ms
SFD985		Low 16-bit
SFD986	ZRN regression velocity VH	High 16-bit
SFD987		Low 16-bit
SFD988	ZRN crawl speed VC	High 16-bit
	Y0 (group3 par	rameters)
SFD990	Pulse default speed low 16-bit	It will output pulse with default speed
SFD991	Pulse default speed high 16-bit	when the speed is 0
CED002	Pulse default speed acceleration	
SFD992	time	
GED002	Pulse default speed deceleration	
SFD993	time	
SFD994	Gear clearance acc/dec time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
GED005		01: S curve acc/dec
SFD995	Acceleration deceleration mode	10: sine curve acc/dec
		11: reserved
		Bit15~ Bit2: reserved
SFD996	Max speed limit low 16-bit	
SFD997	Max speed limit high 16-bit	
SFD998	Start speed low 16-bit	
CED000	~	
SFD999	Start speed high 16-bit	
SFD999 SFD1000	Start speed high 16-bit End speed low 16-bit	

SFD1002	Follow performance parameter	$1\sim100$, 100 means the time constant is one tick, 1 means the time constant is 100
		ticks.
SFD1003	Follow feedforward compensation parameter	0~100, percentage
SFD1004	Pulse frequency refresh time	1ms, 0.1ms
SFD1005		Low 16-bit
SFD1006	ZRN regression velocity VH	High 16-bit
SFD1007		Low 16-bit
SFD1008	ZRN crawl speed VC	High 16-bit
	Y0 (group4 par	rameters)
SFD1010	Pulse default speed low 16-bit	It will output pulse with default speed
SFD1010 SFD1011	Pulse default speed high 16-bit	when the speed is 0
51 2 1011	Pulse default speed acceleration	
SFD1012	time	
	Pulse default speed deceleration	
SFD1013	time	
SFD1014	Gear clearance acc/dec time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
0551015		01: S curve acc/dec
SFD1015	Acceleration deceleration mode	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	
		1~100, 100 means the time constant is
SFD1022	Follow performance parameter	one tick, 1 means the time constant is 100
		ticks.
SFD1023	Follow feedforward compensation	
	parameter	0~100, percentage
SFD1024	Pulse frequency refresh time	1ms, 0.1ms
SFD1025	ZRN regression velocity VH	Low 16-bit
SFD1026		High 16-bit
SFD1027	ZRN crawl speed VC	Low 16-bit
SFD1028		High 16-bit

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, DRVI, DRVA.

• 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

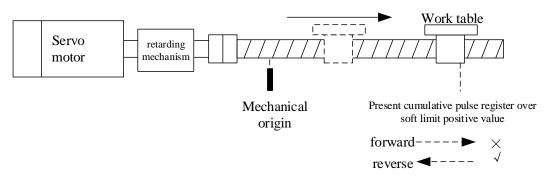
• Soft limit positive value

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.

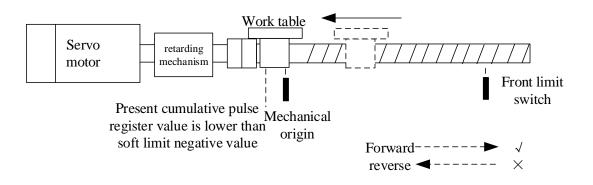
• Soft limit negative value

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.

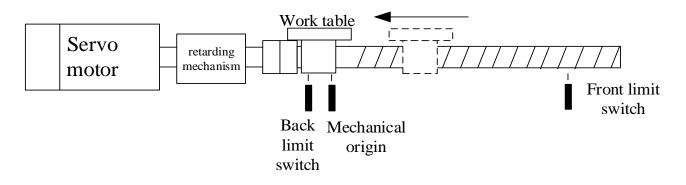
2: fit for PLSR, PLSF, DRVA, DRVI and interpolation instruction.

• Mechanical back to origin default direction

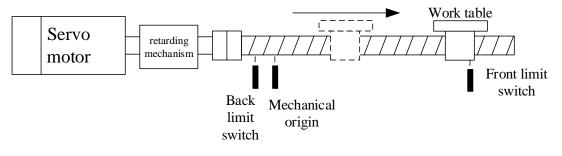
The work table default movement direction when the mechanical back to origin instruction ZRN is executed. The configuration:

YO	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
▶ З	3000	6000	pulse sending complete	KO	KO

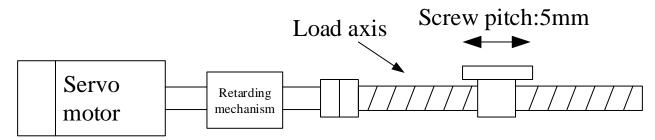
There are three segments in the configuration table, segment 1 will send 2000 pulses at the speed 1000Hz, segment 2 will send 4000 pulses at the speed 2000Hz, segment 3 will send 6000 pulses at the speed 3000Hz.

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
Z	Pulse number	150000pulse/s	300000 pulse
3	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, DRVI, DRVA.

• Pulse type

This parameter is mainly used to select the pulse output mode of differential output PLC, which has two modes: one-way pulse and AB phase pulse.

YO axis-Common-Parameters setting-Pulse unit	pul	se number	
YO axis-Common-Parameters setting-Pulse type		e-way pulse	
YO axis-Common-Parameters setting-Interpolation coor	One AB r	way pulse	

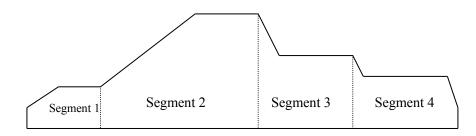
• Interpolation coordinate mode

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

• Pulse send mode

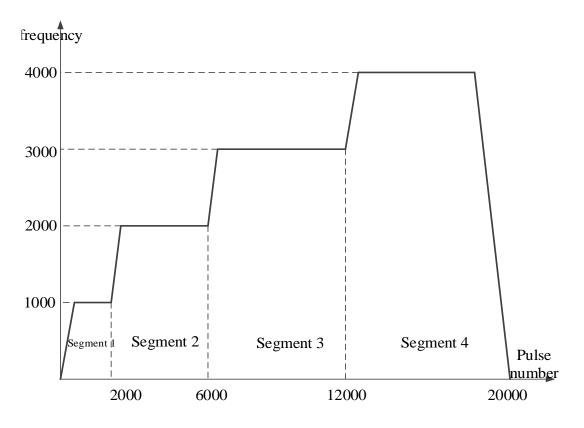
It includes complete mode and continue mode.

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

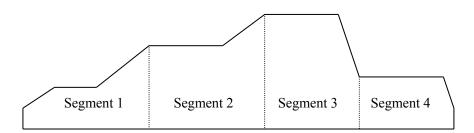


The pulse curve please refer to above diagram. Each segment will send the pulse numbers at setting speed. Except the last segment, each segment includes rising or falling part, stable part. The last segment includes rising part, falling part and stable part.

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.

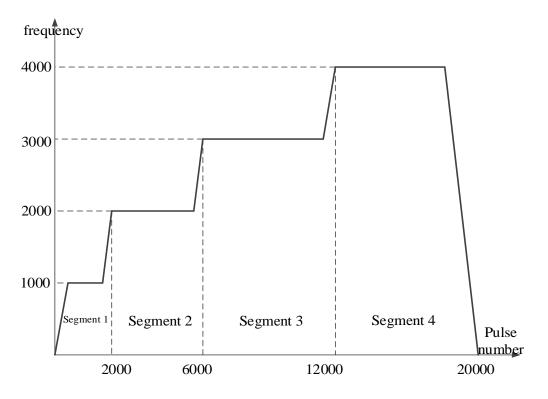


Continue mode: it already accelerates or decelerates to next segment when present segment pulse finishes sending.



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	Y no terminal
YO axis-Common-Delayed time of pulse direction (ms)	10

XG full series PLC with transistor output, XG1-16T4/ XG2-26T4 has four pulse outputs (Y0, Y1, Y2, Y3), and all output terminals except Y0, Y1, Y2, Y3 can be selected for the direction 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.

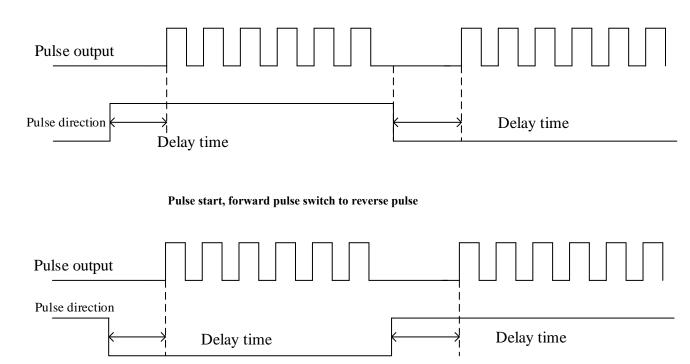
• Delayed time of pulse direction

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.

 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



Reverse pulse switch to forward pulse

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 XG1-16T4-E) or relay output(about 10ms), 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

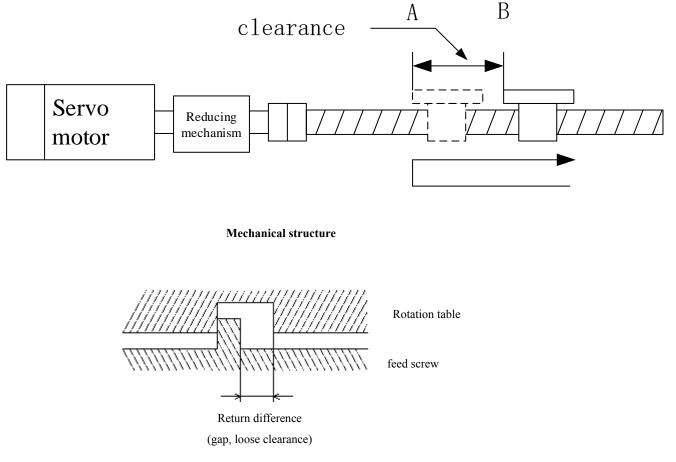
pulse).

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, DRVI, DRVA.

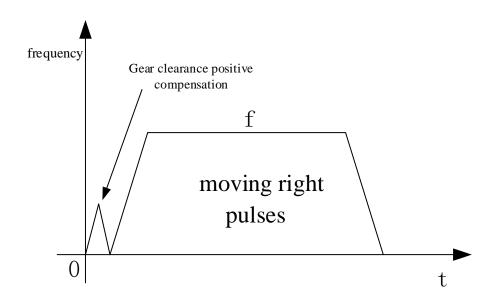
• Gear clearance positive compensation

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.



Mechanical clearance structure

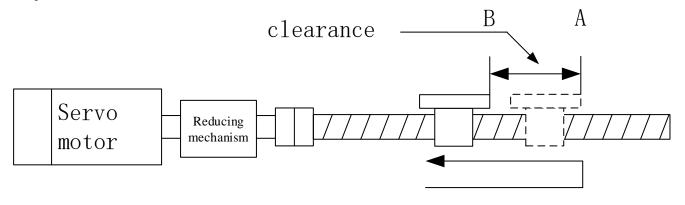
The table moves from right to left, when the table left side moves to position A, it will stop and moves from left to right. As the ball screw clearance, it cannot move right for some pulses, and the actual moving distance is less than setting value. If there is no clearance, it will move from A to B.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



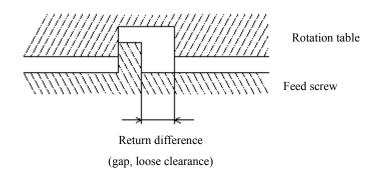
Note:

- %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 DRVI, DRVA, PLSR.
- *5: the unit of gear clearance positive compensation is decided by pulse unit.
 - Gear clearance negative compensation

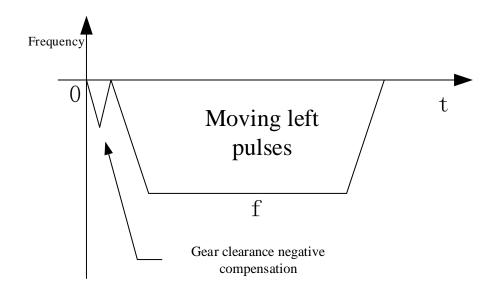
When the work table finished forward moving and switched to reverse moving, there is clearance between table and ball screw, it will cause the actual moving distance is less than setting value, this parameter can delete this error.



Mechanical structure



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 DRVI, DRVA, PLSR.
- %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.

PLC1 - Pulse Set		x		
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	- 1		
YO axis-Common-Z phase terminal setting	X no term	- a		
···· · · · · · · · · · · · · · · · · ·		×		
Read From PLC Write To PLC OK	Cancel			

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.
- X3: Z phase input terminals:

PLC model	Z phase terminal setting
XG1-16T4	X2, X3, X4, X5, X6, X7
XG2-26T4	X2, X3, X4, X5, X6, X7, X10, X11, X12, X13, X16, X21

Note:

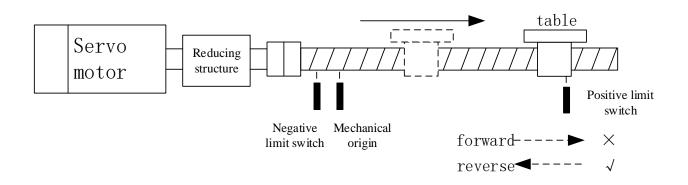
In the Z-phase terminal setting of XG2-26T4, X2 X5 X10 X13 are the collector input signal, X3 X4 X6 X7 X11 X12 are the differential input signal, X2 X3 X4 X5 X6 X7 X10 X11 X12 X13 are the high-speed external interrupt, the repetition period is 10kHz, X16 X21 are the low-speed external interrupt, the repetition period is 1kHz.

• 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.



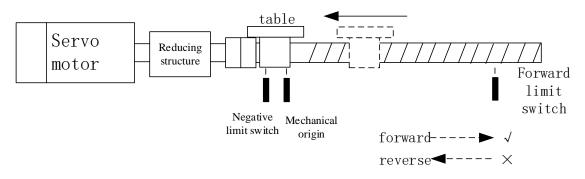
Notes:

- %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, DRVI, DRVA.
 - 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, DRVI, DRVA.

• Zero clear CLR output setting

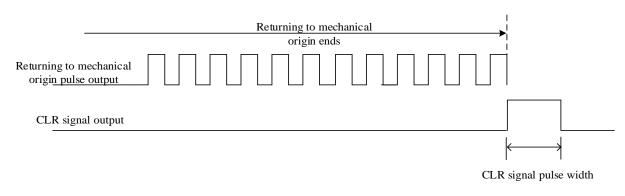
It will output the signal after the returning mechanical origin ends. This signal can send to other device such as servo drive to clear the servo motor error counter, then copy the mechanical origin position to present position to finish the returning to zero process.

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).

0
20
0
0



CLR signal diagram

Notes:

- **※**1: only fit for instruction ZRN.
- X2: 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:

- \times 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: The regression speed VH gives priority to the settings in the parameter block. When the user configures the regression speed VH in the parameter block, the value in the parameter block is used. When the parameter block is not configured, the regression speed VH in the common parameter is used, so it is recommended to use the parameter block setting.
 - Creeping speed VC (recommend to use parameter block)

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:

- \times 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.
- *5: The setting in the parameter block is preferred for the crawling speed VC. When the user configures the crawling speed VC in the parameter block, the value in the parameter block is used. When the parameter block is not configured, the crawling speed VC in the common parameter is used.
 - 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:

 \times 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

• Fast locate instruction default parameter block

DRV, DRVI, DRVA instruction use this parameter block. The first set is used by default.

¥О	axis-Common-Rated speed corresponding frequency (100Hz) (0
¥О	axis-Common-Positioning completion time limit (ms) (close	0
¥Ο	axis-Common-Fast locate instruction default parameter block	1
¥Ο	axis-Common-Interpolation instruction default parameter b	2
YO	axis-group O-Pulse default speed	1000

Note: this parameter only works for XG1 series PLC firmware v3.5.3b and up.

• Interpolation instruction default parameter block

LIN, CW, CCW, ARC and other interpolation instruction use this parameter block. The second set is used by default.

YO	axis-Common-Positioning completion time limit (ms) (close	0
YO	axis-Common-Fast locate instruction default parameter block	1
YO axis-Common-Interpolation instruction default parameter b		2
YO	axis-group O-Pulse default speed	1000

Note: this parameter only works for XG1 series PLC firmware v3.5.3b and up.

Group 1 parameters (group 0, 2, 3, 4 parameters please refer to group 1)

Note:

1: The group 0 parameters is only supported by XG1 series PLC firmware v3.5.3b and up. 2: When the user needs to frequently change the default speed, acceleration and deceleration time and other parameters, it is recommended to use group 0 parameters.

• 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.

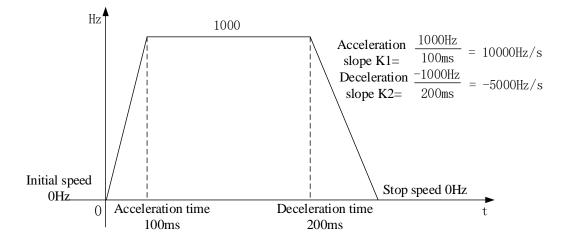
Acceleration slope = (pulse default speed-0)/ acceleration time of default pulse speed Deceleration slope = (pulse default speed-0)/ deceleration time of default pulse speed The unit of [**default pulse speed**] is still determined by whether the [**pulse unit**] is the number of pulses or equivalent (1 mm, 0.1 mm, 0.01 mm, 1 um) (that is, when the pulse unit is the number of pulses, the setting parameter unit is Hz; When the pulse unit is equivalent, the setting parameter is length.)

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

Example 1:

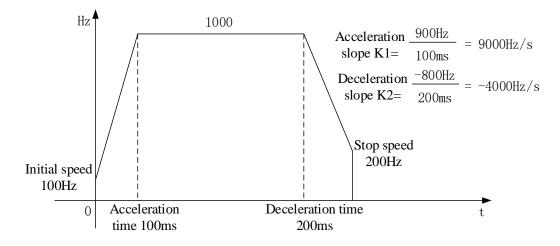
When the pulse unit is pulse numbers, pulse default speed is 1000Hz, acceleration time of pulse default speed is 100ms, deceleration time of pulse default speed is 200ms, initial speed is 0Hz, stop speed is 0Hz, it means the pulse frequency takes 100ms to increase 1000Hz and takes 200ms

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.



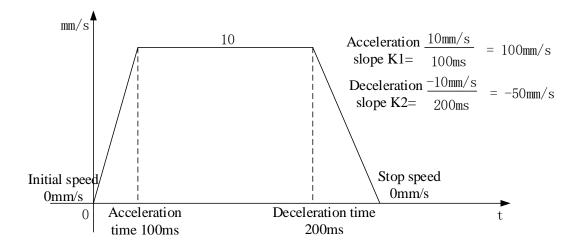
Example 2:

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.



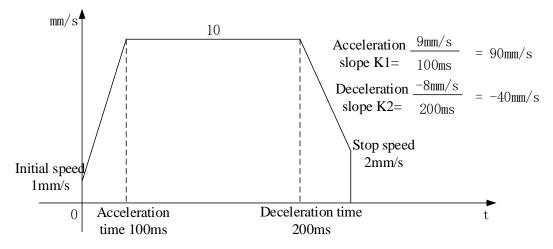
Example 3:

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.

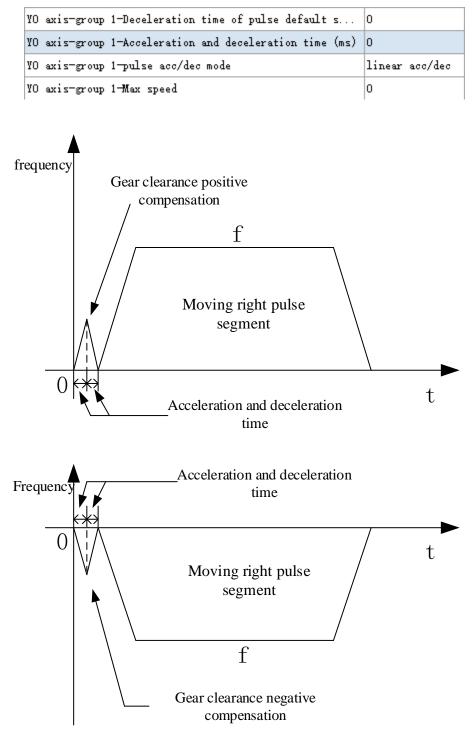


Note:

- %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.
- X4: 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:

 \times 1: the acceleration time and deceleration time is same.

*2: the acceleration and deceleration time is fixed value whatever how many is the gear

clearance compensation.

X3: this parameter is fit for instruction PLSR, PLSF, DRVI, DRVA, ZRN.

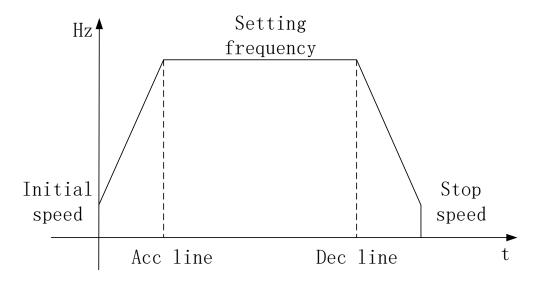
• Pulse acc/dec mode

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

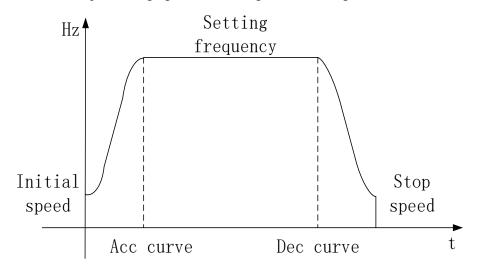
0
0
linear acc/dec
0
0

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

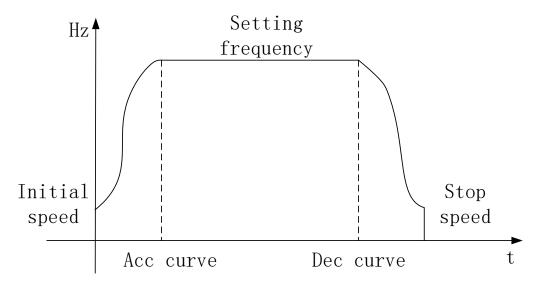
Linear mode: the speed changing for accelerating or decelerating is line.



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, DRVI, DRVA.

• 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:

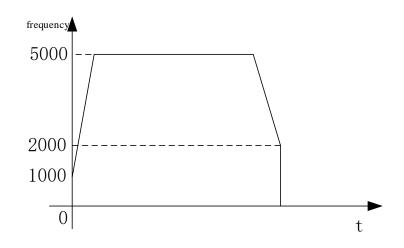
- %1: the max speed unit is changing as pulse unit(pulse number or equivalent).
- *2: In the program with pulse command, it is necessary to set the maximum speed, and the default value is 100000.
- ※3: when the pulse unit is equivalent, the transformed pulse frequency maybe very large and over max speed, 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, DRVI, DRVA.
 - 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, DRVI, DRVA.

• 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

• Pulse frequency refresh time

This time can be set by user, 100us or 1ms optional, the default is 1ms refresh time.

YO	axis-group 1-FOLLOW forward compensation(0-100)	0
YO	axis-group 1-Pulse frequency refresh time	1 ms refresh
YO	axis-group 1-ZRN regression velocity VH	0

• ZRN regression velocity VH

This parameter is same to [common parameter-return speed VH], this parameter is preferred.

3	10 axis-group 1-Pulse frequency refresh time	1 ms refresh
1	20 axis-group 1-ZRN regression velocity VH	0
2	20 axis-group 1-ZRN crawl speed VC	0

Note: this parameter is only valid for PLC firmware v3.5.3 and above.

• ZRN crawl speed VC

This parameter is same to [common parameter-creeping speed VC], this parameter is preferred.

YO	axis-group 1-ZRN regression velocity VH	0
YO	axis-group 1-ZRN crawl speed VC	0
YO	axis-group 2-Pulse default speed	1000

Note: this parameter is only valid for PLC firmware v3.5.3 and above.

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.

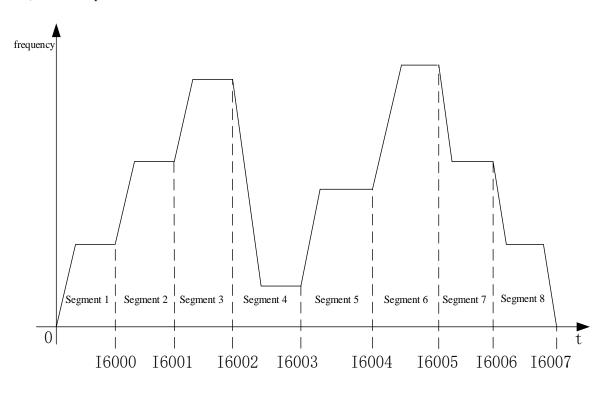
Note: each pulse segment has only one related interruption flag, whatever how is the pulse configuration jump setting, the interruption flag will be executed when this pulse segment is running.

Inter	ruption flag	Pulse axis	Notes
I60**(I	[6000~I6099)	PLS+0 (pulse)	Y0 axis 100 pulse segments interruption
I61**(I	(1000~I6199)	PLS+1 (pulse)	Y1 axis 100 pulse segments interruption
I62**(I	[6200~I6299)	PLS+2 (pulse)	Y2 axis 100 pulse segments interruption
I63**(I	(6300~I6399)	PLS+3 (pulse)	Y3 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:

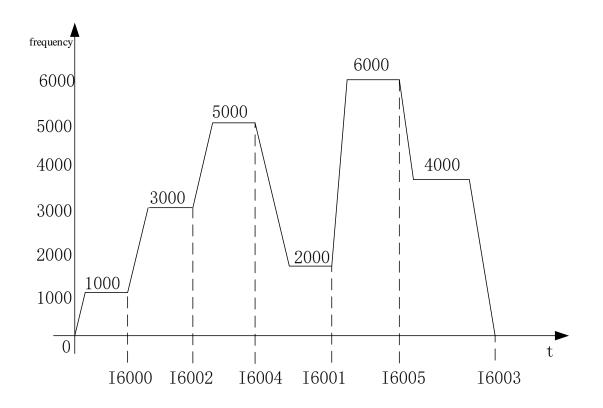


Example 2:

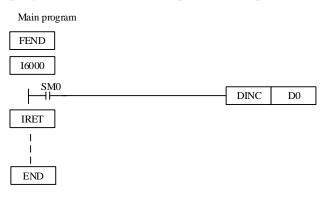
The PLC has 6 pulse segments, the pulse output terminal is Y0, but the pulse is not continuous outputting.

multi section pulse output						
		user params address:	HD100 system params: K1	output: Y0		
mode: relative start execute section count: 0 Config Add Delete Upwards Downwards						
		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	K5
4		4000	4000	pulse sending complete	KO	KO
5		5000	5000	pulse sending complete	KO	K2
▶ 6		6000	6000	pulse sending complete	KO	K4
used space: HD0-HD69,HD100-HD103 Read From PLC Write To PLC OK Cancel						

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

No.	Coil	Axis no.	Note
1	SM1000	PULSE_1	The coil is ON when the pulse is sending, the coil will be OFF when the pulse sending ends. The falling edge of coil can judge whether the
2	SM1020	PULSE_2	pulse sending is completed.
3	SM1040	PULSE_3	Pulse segment
4	SM1060	PULSE_4	5 m1000

Pulse sending flag

> Pulse sending direction flag

No.	Coil	Axis no.	Note
1	SM1001	PULSE_1	When the pulse number is positive value and forward direction, the coil is ON, when the pulse number is negative value and reverse
2	SM1021	PULSE_2	direction, the coil is OFF.
3	SM1041	PULSE_3	Pulse segment
4	SM1061	PULSE_4	SM10 <u>01</u>

> High speed pulse special regsiter HSD (latched)

No.	Function	Note	Axis no.
HSD0	Cumulative pulses low 16-bit		
HSD1	Cumulative pulses high 16-bit	The unit is pulse number	
HSD2	Cumulative pulses low 16-bit	The state in the state of the s	Y0
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	The unit is a minuter	Y1
HSD7	Cumulative pulses high 16-bit	The unit is equivalent	

HSD8	Cumulative pulses low 16-bit	The unit is guiles gumber	
HSD9	Cumulative pulses high 16-bit	The unit is pulse number	Y2
HSD10	Cumulative pulses low 16-bit	The unit is a minuted	¥ Z
HSD11	Cumulative pulses high 16-bit	The unit is equivalent	
HSD12	Cumulative pulses low 16-bit	The unit is mules much on	
HSD13	Cumulative pulses high 16-bit	The unit is pulse number	Y3
HSD14	Cumulative pulses low 16-bit	The unit is a minuted	13
HSD15	Cumulative pulses high 16-bit	The unit is equivalent	

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

(1) Instruction overview

Multi-segment pulse output instruction.

Multi-segme	ent pulse output [PLSR]		
16-bit	-	32-bit	PLSR
Execution	Rising /falling edge of the coil	Suitable	XG1, XG2
condition		model	
Hardware	-	Software	-

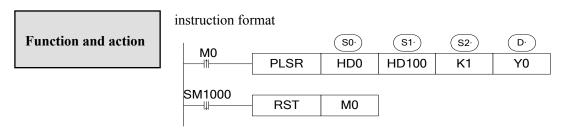
(2) Operand

Operand	Function	Туре
S0	Pulse data start address	32-bit double word
S1	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

(3) Suitable soft component

Word	Operand					Sys	stem				Constant	Mod	ule
		D^*	F	D	TD*	CD	DX	DY	DM*	DS^*	K/H	ID	QD
						*							
	S0	•	•		•	•	•	•	•	•			
	S1	•	•		•	•	•	•	•	•			
	S2	•	•								•		
	Operand				Sys	tem							
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 (XG1), 1Hz~150KHz (XG2). The value increasing

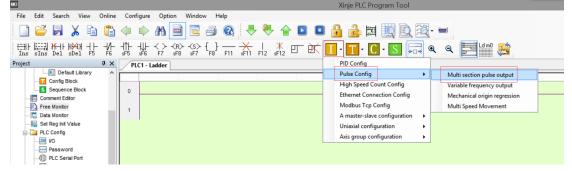
means acceleration, the value decreasing means deceleration, it is not related to the pulse direction.

- 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.

Note: PLC can output high-speed pulses of 100khz~200khz, but it cannot ensure that all servos operate normally. Please connect about 500 Ω resistance between the output end and 24V power supply.

Instruction configuration

Click pulse config/Multi section pulse output.



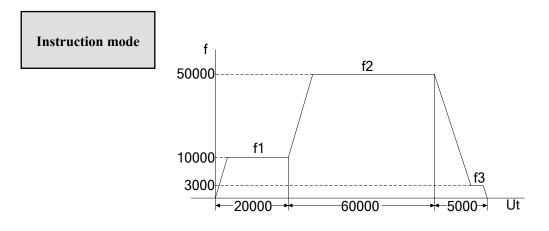
Click Add to add pulse frequency, pulse numbers and conditions, then click config to set pulse parameters, which including pulse direction terminal, pulse default speed, pulse acc/dec time and so on. Finally click write to PLC and ok. For the configuration details, please refer to the examples in this chapter.

		multi sec	tion pulse output		
data start address:	HD0 user pa	arams address:	HD100 system params: K	1 output: Y0	
mode:	relative ∀ start ex	ecute section count:	0 Config		
Add Delete	Jpwards Downwar	ds			
	frequence	pulse count	wait condition	wait register	jump register
used space: HD0	HD9,HD100-HD103		Read From PLC Write To P	сок	Cancel

Data start address (S0) explanation:

Address	Notes	Value	Note
HD0 (S0+0) (double word)	Pulse total sections (1 to 100)	4	
HD2 (8 words) (S0+2)	Reserved	0	
HD10 (S0+10) (double words)	Pulse frequency of section 1 (#1)	2000	Pulse section 1
HD12 (double word) (S0+12)	Pulse number of section 1 (#1)	3000	
HD14 (S0+14)	bit15~bit8: waiting condition (#1) H00: pulse sending completion H01: wait time H02: wait signal H03: ACT time H04: 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	256	
HD15 (double word) (S0+15)	Constant value/ register no. (for waiting condition)(#1)	100	
HD17 (S0+17)	bit7~bit0: jump register type	0	

	H00: constant value		
	H00: constant value H01: D		
	H01: D H02: HD		
	H03: FD		-
HD+18 (double word)	Constant value/register no. (for jump register)(#1)	0	
HD+20 (S0+20) (double word)	Pulse frequency of section 2 (#2)	2800	Pulse section 2
HD+22 (S0+22)	Pulse number of section 2 (#2)	7000	-
(double word)			
HD+24 (S0+24)	Waiting condition, waiting condition register type (#2)	517	-
HD+25 (S0+25)			-
(double word)	Constant value or register no. (for waiting condition) (#2)	100	
HD+27 (S0+27)	Jump type, jump register type (#2)	0]
HD+28 (S0+28)]
(double word)	Constant value or register no. (for jump register) (#2)	0	
HD+30 (S0+30)		1200	Pulse
(double word)	Pulse frequency of section 3 (#3)	1200	section 3
HD+32 (S0+32)		000000000	1
(double word)	Pulse number of section 3 (#3)	9999999999	
HD+34 (S0+34)	Waiting condition, waiting condition register type (#3)	768	1
HD+35 (S0+35)		2000	1
(double word)	Constant value or register no. (for waiting condition) (#3)	2000	
HD+37 (S0+37)	Jump type, jump register type (for waiting condition) (#3)	0	1
HD+38 (S0+38)			1
(double word)	Constant value or register no. (for jump register) (#3)	0	
S0+N*10+0	Pulse frequency of section N		Pulse
(double word)	Pulse frequency of section N		section N
S0+N*10+2	Deles much as of section M]
(double word)	Pulse number of section N		
S0+N*10+4	Waiting condition, waiting condition register type		1
S0+N*10+5			1
(double word)	Constant value or register no. (for waiting condition)		
S0+N*10+7	Jump type, jump register type (for waiting condition)		1
S0+N*10+8			1
(double word)	Constant value or register no. (for jump register)	1	



Pulse curve

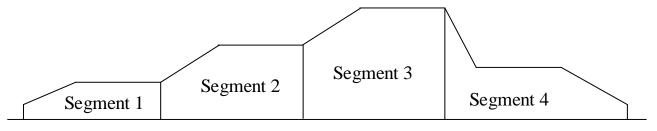
1 10000 20000 pulse sending complete KO KU	node:	relative ∨ start	waauta aaatian aaunti				
frequence pulse count wait condition wait register jumage 1 10000 20000 pulse sending complete K0 K0			execute section count:	0 Contig			
1 10000 20000 pulse sending complete KO KU	Add De	ete Upwards Downwa	ards	· · · ·			
		frequence	pulse count	wait condition			jump register
	1	10000	20000	pulse sending com	plete	KO	KO
2 50000 60000 pulse sending complete KU KU	2	50000	60000	pulse sending com	plete	KO	KO
▶ 3 3000 5000 pulse sending complete KO KK	▶ 3	3000	5000	pulse sending com	plete	KO	KO

Pulse instruction parameter configuration table



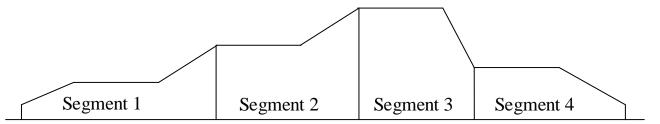
The following curves are set the parameters when the acceleration time is 0.

(1) Pulse segment completion mode division



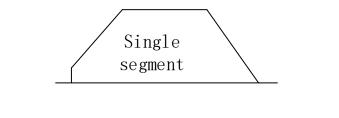
- The segment are divided as above diagram
- Except the last segment, all the segments include rising, stable and falling part.
- The last segment includes rising or falling, stable and rising or falling part.

(2) Pulse segment subsequent mode division

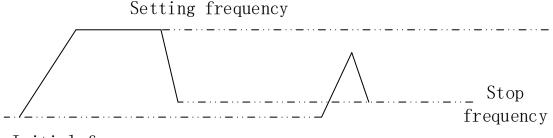


- The segment subsequent mode curve is shown as above diagram.
- It already switched to next segment speed when present segment ends. Except the first segment, other segments include stable part, rising or falling part.
- The first segment includes rising part or falling part, stable part, rising part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

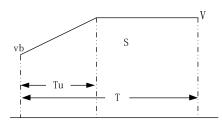


• The pulse numbers are not enough The pulse curve is triangle.



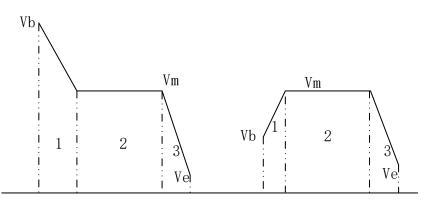
Initial frequency

(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.

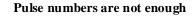
(6) the segment which the pulse numbers are 0

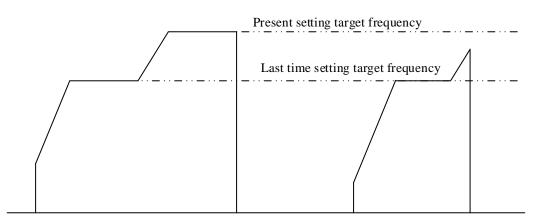
• If the present segment pulse frequency or pulse number is 0, it will output pulse as default speed.

(7) dynamic modify present pulse frequency

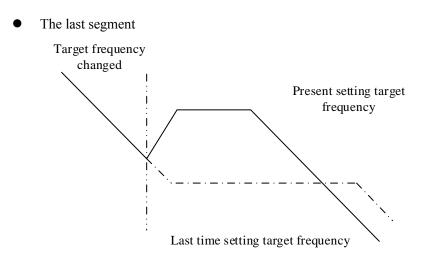
• Not the last segment

Pulse numbers are enough





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



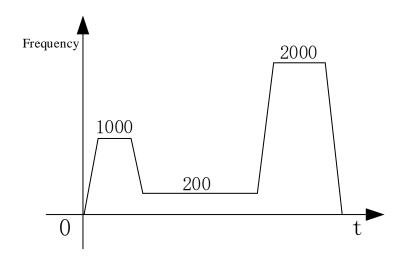
When the present pulse frequency is changed by user, PLC will calcuate the pulse curve again, then output pulse as the new pulse curve.

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

MO	PLSR	HD0	HD100	K1	Y0
SM1000	RST	MO			

- Software configuration
- (1) Pulse segment configuration

data start ac mode:		execute section count:	HD100 system params: K1 0 Config	output: Y0	
Add Del	Add Delete Upwards Downwards				
	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
▶ З	2000 6000		pulse sending complete	KO	KO

(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
YO 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
VO axis-group 1-stop speed	0
VO axis-group 1-FOLLOW performance param(1-100)	50
VO axis-group 1-FOLLOW forward compensation(0-100)	0

(3) Pulse data address distribution table

Address	Notes	Value	
HD0	Dulas total assemants (1 to 100)	3	
(double word)	Pulse total segments (1 to 100)	3	
HD2 (8 words)	Reserved	0	
HD10	Pulse frequency (#1)	1000	
(double words)		1000	
HD12 (double	Pulse number (#1)	2000	
word)		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	Constant value/ register no. (for waiting condition)(#1)	0	
(double word)	Constant value/ register no. (101 waiting condition)(#1)	0	
	bit7~bit0: jump register type		
HD17	H00: constant value	0	
111/1/	H01: D	U	
	H02: HD		

	H03: FD	
HD+18	Constant value/register no. (for jump register)(#1)	0
(double word)		0
HD+20	Pulse frequency (#2)	200
(double word)		200
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 of register no. (for warning 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)	
HD+30	Pulse frequency (#3)	2000
(double word)	ruise nequency (#3)	2000
HD+32	Pulse number (#3)	6000
(double word)		0000
HD+34	Waiting condition, waiting condition register type (#3)	0
HD+35	Constant value or register no. (for waiting condition) (#3)	0
(double word)	Constant value of register no. (for waiting condition) (#3)	0
HD+37	Jump type, jump register type (for waiting condition) (#3)	0
HD+38	Constant value or posistor no (for iumn posistor) (#2)	0
(double word)	Constant value or register no. (for jump register) (#3)	0

			1	
		Bit1: pulse direction logic		Co
		0: positive logic, 1: negative logic,		Common parameter
		default is 0		on
		Bit2: soft position limit		para
		0: OFF 1: ON, default is 0		ume
		Bit3: machine back to origin direction		ter
		0: negative direction 1: positive		
		direction, default is 0		
		Bit10~ Bit8: pulse unit		
		Bit8: 0: pulse numbers, 1: equivalent		
		000: pulse numbers		
SFD900	Pulse parameter setting	001: micron	0	
		011: centimillimeter		
		101: decimillimeter		
		111: millimeter		
		Default is 000		
		Bit13: pulse type		
		0: single direction pulse 1: AB		
		phase pulse (only for		
		XD5-48D4T4-E), default is 0		
		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		
	Pulse number/1 rotation low			-
SFD902	16 bits		1	
	Pulse number/1 rotation high			
SFD903	16 bits		0	
	Motion quantity/1 rotation			1
SFD904	low 16 bits		1	
	Motion quantity/1 rotation			1
SFD905	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		0	
	compensation			
SFD909	Gear clearance negative		0	
	compensation			
SFD910	Electrical origin low 16 bits		0	-
SFD911	Electrical origin high 16 bits		0	

				,
		Bit0: origin signal switch state		
		Bit1: Z phase switch state		
SFD912		Bit2: positive limit switch state		
	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 sotting	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 terminal setting	limit, 0xFF is no terminal	FFFF	
51 D 915	Linni terminai setting	Bit15~bit8: X terminal of negative	TTTT	
		limit, 0xFF is no terminal		
QED017	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no	0EE	
SFD917	terminal	terminal	0xFF	
CED010	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	
GED022	Crawling speed VC high 16		0	
SFD923	bits		0	
SED024	Mechanical origin position		0	
SFD924	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	Coff limit position limit and	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
	Pulse default speed low 16		1000	G
SFD950	bits		1000	Group 1
	Pulse default speed high 16	It will send pulse with default speed	_	р 1
SFD951	bits	when the speed is 0.	0	
	Pulse default speed	~		1
SFD952	acceleration time		100	
	ucceletation time			

SFD953	Pulse default speed		100
SFD933	deceleration time		100
SFD954	Acceleration and		0
SFD934	deceleration time		
		Bit 1~0: acc/dec mode	
		00: line	
SFD955	Pulse acceleration and	01: S curve	
SFD933	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
	E II C.	$1 \sim 100$, 100 means the time constant is	50
SFD962	Follow performance	one tick, 1 means the time constant is	
	parameters	100 tick.	
9FD072	Follow feedforward		0
SFD963	compensation	0~100, percentage	
•••			

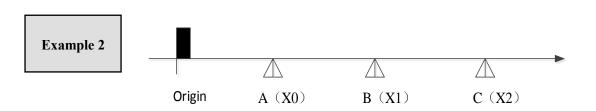
Note:

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

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



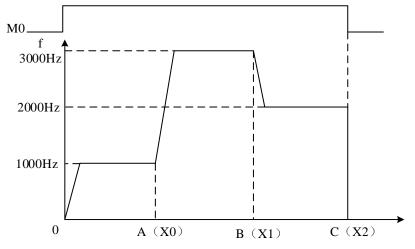
As the above diagram, it needs to move three segments of distance, the position of A, B, C is unknown and the moving speed is different for each segment. We can configure the PLSR to do it. First we install proximity switch at point A, B, C and connect to PLC input X0, X1, X2. The pulse output terminal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

Each segment pul	se frequency an	d numbers:
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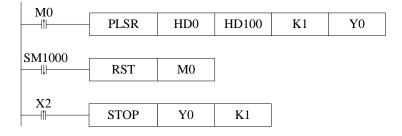
Segment	Frequency setting (Hz)	Pulse number setting	
Origin to A	1000	999999999	
A to B	3000	999999999	
B to C	2000	999999999	
Acceleration/deceleration time	The frequency will change 1000Hz every 100ms		

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								
data mod	a start addr le:		user params address: start execute section count:	HD100 system params:	K1	output:	YO	
Ad	dd Delet	e Upwards Dow	pulse count	wait condition		wa regi		jump register
	1 2	1000 2000	999999999999999999999999999999999999999	EXT signal EXT signal		XC X1		KO KO
•	3	2000	9999999999	EXT signal		X2	2	KD
used	space:	HD0-HD39,HD100-I	40103	Read From PLC Wri	te To PLC		ок	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
VO 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)	3	
HD2 (8 words)	Reserved	0	
HD10	Pulse frequency (#1)	1000	
(double words)	ruise nequency (#1)	1000	
HD12 (double	$\mathbf{P}_{\mathbf{M}}$	9999999999	
word)	Pulse 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	Constant and had an internet (for an iting and iting)(#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		
(double word)	Constant value/register no. (for jump register)(#1)	0
HD+20	HD+20 Pulse frequency (#2)	
(double word)		
HD+22	Pulse number (#2)	999999999
(double word)		
HD+24	Waiting condition, waiting condition register type (#2)	1028
HD+25		
(double word)	Constant value or register no. (for waiting condition) (#2)	1
HD+27	Jump type, jump register type (#2)	0
HD+28		-
(double word)	Constant value or register no. (for jump register) (#2)	0
HD+30		
(double word)	Pulse frequency (#3)	2000
HD+32		
(double word)	Pulse number (#3)	9999999999
HD+34	Waiting condition, waiting condition register type (#3)	1028
HD+34	watting condition, waiting condition register type (#3)	1020
	Constant value or register no. (for waiting condition) (#3)	2
(double word)		0
HD+37	Jump type, jump register type (for waiting condition) (#3)	0
	HD+38 Constant value or register no. (for jump register) (#3)	
(double word)		0

	Ι			
		Bit1: pulse direction logic		Co
		0: positive logic, 1: negative logic,		Common parameter
		default is 0		on
		Bit2: soft position limit		para
		0: OFF 1: ON, default is 0		ume
		Bit3: machine back to origin direction		ter
		0: negative direction 1: positive		
		direction, default is 0		
		Bit10~ Bit8: pulse unit		
		Bit8: 0: pulse numbers, 1: equivalent		
		000: pulse numbers		
SFD900	Pulse parameter setting	001: micron	0	
		011: centimillimeter		
		101: decimillimeter		
		111: millimeter		
		Default is 000		
		Bit13: pulse type		
		0: single direction pulse 1: AB		
		phase pulse (only for		
		XD5-48D4T4-E), default is 0		
		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	1	
		mode, default is 0		
	Pulse number/1 rotation low			
SFD902	16 bits		0	
	Pulse number/1 rotation high			1
SFD903	16 bits		1	
	Motion quantity/1 rotation			1
SFD904	low 16 bits		0	
	Motion quantity/1 rotation			1
SFD905	high 16 bits		2	
SFD906	Pulse direction terminal	Y terminal no., 0xFF is no terminal	20	-
SFD907	Direction delay time	Default is 20, unit: ms	0	-
51 0707	Gear clearance positive	2014un 15 20, unt. 115		
SFD908	compensation		0	
	-			-
SFD909	e		0	
SED010	compensation		0	-
SFD910	Electrical origin low 16 bits		0	-
SFD911	Electrical origin high 16 bits		0	

	T			
		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	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 D 914	Z phase terminal setting	terminal(interruption)	ГГГГ	
		Bit7~bit0: X terminal of positive		
SFD915	Limit terminal setting	limit, 0xFF is no terminal	0xFF	
51 D 91 5	Linni terminai 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	
51 071/	terminal	terminal	U	
SFD918	Returning speed VH low 16		0	
51 0 918	bits		0	
SFD919	Returning speed VH high 16		0	
560919	bits		0	
SFD922	Crawling speed VC low 16		0	
SFD922	bits		0	
SFD923	Crawling speed VC high 16		0	
51 D925	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		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	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	1	
				1
•••				
CED050	Pulse default speed low 16		1000	G
SFD950	bits		1000	Group 1
OFDA71	Pulse default speed high 16	It will send pulse with default speed	0	5 1
SFD951	bits	when the speed is 0.	0	
OFDA 72	Pulse default speed		100	1
SFD952	acceleration time		100	
l	1	1		

SFD953	Pulse default speed		100
	deceleration time		
SFD954	Acceleration and		0
51 0754	deceleration time		
		Bit 1~0: acc/dec mode	
		00: line	
	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		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	50
SFD962	Follow performance	one tick, 1 means the time constant is	
	parameters	100 tick.	
	Follow feedforward		0
SFD963	compensation	0~100, percentage	
•••			

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).

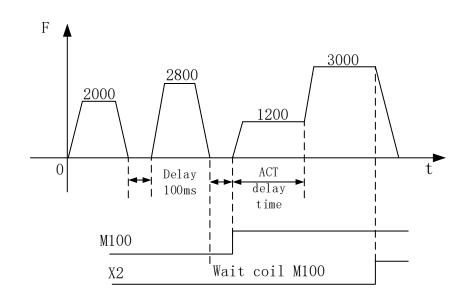
For example:

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

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 999999999. 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.



➢ Pulse curve:

Pulse instruction

M	0					
	-	PLSR	HD0	HD100	K 1	Y0

- Pulse data configuration
- (1) Pulse segment configuration

		address: HD	oo ative v	 ams address:	HD100	system params:	K1	output:	YO	
nod Ac		elete Upwa			U					
		fre	quence	pulse count		wait condition		wa regi		jump register
Þ	1	2	000	3000		wait time		K1	00	KO
	2	2	800	4000		wait signal		M1(00	KO
	3	1	200	999999999		ACT time		K20	00	KO
	4	3	000	999999999		EXT signal		X	2	KO

Pulse data configuration (relative mode)

	multi section pulse output								×		
		ams address: ecute section count:	HD100	system params	s: K1	output:	YO				
Add D	Add Delete Upwards Downwards										
		frequence		pulse count		wait conditi	on	wa regi		jump register]
1		2000		3000		wait time	e	K1(KO	
2		2800		7000		wait sign:	al	M10	00	KO	
3		1200		1000006999		ACT time	1	K20	00	KO	
▶ 4		3000		2000006998		EXT signa	1	X	2	KO	
used space	HD0	-HD49,HD100	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
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	1000
YO axis-group 1-Acceleration time of Pulse default s	80
YO axis-group 1-Deceleration time of pulse default s	120
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)	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	Dulce number (#1)	2000
word)	Pulse number (#1)	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 on log (maintain and (for maintain a condition)(#1)		100
(double word)	Constant value/ register no. (for waiting condition)(#1)	100
	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)	Constant value/register no. (for jump register)(#1)	0
HD+20	Dulas fraguer av (#2)	2800
(double word)	Pulse frequency (#2)	2800
HD+22	Pulse number (#2)	7000
(double word)		
HD+24	Waiting condition, waiting condition register type (#2)	517
HD+25	Constant value on magister and (for second views) (//2)	100
(double word)	Constant value or register no. (for waiting condition) (#2)	100
HD+27	Jump type, jump register type (#2)	0
HD+28		0
(double word)	Constant value or register no. (for jump register) (#2)	0
HD+30		1200
(double word)	Pulse frequency (#3)	1200
HD+32	Delas much er (#2)	00000000
(double word)	Pulse number (#3)	9999999999

HD+34	Waiting condition, waiting condition register type (#3)	768
HD+35	Constant value or register no. (for waiting condition) $(\#2)$	2000
(double word)	Constant value or 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) (#3)	0
(double word)	Constant value of register no. (not jump register) (#5)	0
HD+40	Dulse frequency (#4)	3000
(double word)	Pulse frequency (#4)	3000
HD+42	Dulse number (#4)	9999999999
(double word)	Pulse number (#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 and has an explored and (for immediately (#4))	0
(double word)	Constant value or register no. (for jump register) (#4)	0

SFD900	Pulse parameter setting	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 Bit13: pulse type 0. i. b. i. c. 1. AD	0	Common parameter
		101: decimillimeter 111: millimeter Default is 000		

SFD901Pulse sending modeSFD902Pulse number/1 rotation low 16 bitsSFD903Pulse number/1 rotation high 16 bitsSFD904Motion quantity/1 rotation low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay time compensationSFD908Gear clearance positive compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalSFD917Returning speed VH low 16	Bit 0: pulse sending mode 0: complete mode 1: subsequence mode, default is 0	0
SFD902Pulse number/1 rotation low 16 bitsSFD903Pulse number/1 rotation high 16 bitsSFD904Motion quantity/1 rotation low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay time compensationSFD908Gear clearance positive compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output 		0
SFD90216 bitsSFD903Pulse number/1 rotation high 16 bitsSFD904Motion quantity/1 rotation low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay time Gear clearance positive compensationSFD908Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16	mode, default is 0	
SFD90216 bitsSFD903Pulse number/1 rotation high 16 bitsSFD904Motion quantity/1 rotation low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		┥────┤
16 bitsSFD903Pulse number/1 rotation high 16 bitsSFD904Motion quantity/1 rotation low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		1
SFD90316 bitsSFD904Motion quantity/1 rotation low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16	ļ	1
16 bitsSFD904Motion quantity/1 rotation low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		0
SFD904low 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		0
Iow 16 bitsSFD905Motion quantity/1 rotation high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		1
SFD905high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		1
high 16 bitsSFD906Pulse direction terminalSFD907Direction delay timeSFD908Gear clearance positive compensationSFD909Gear clearance negative compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		0
SFD907Direction delay timeSFD908GearclearancepositiveCompensationGearclearancenegativeSFD909GearclearancenegativeSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917ClearsignalClearsignalCLROutputterminalReturningspeedVH low16		0
SFD908Gear compensationSFD909Gear clearance compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear terminalReturning speed VH low 16	Y terminal no., 0xFF is no terminal	2
SFD908Gear compensationSFD909Gear clearance compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear terminalReturningSpeed VH low 16	Default is 20, unit: ms	20
compensationSFD909GearclearancenegativecompensationcompensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917ClearClearsignalClearclearSFD917ClearReturningspeedVH low16		
SFD909compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		0
compensationSFD910Electrical origin low 16 bitsSFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		0
SFD911Electrical origin high 16 bitsSFD912Signal terminal state settingSFD914Z phase terminal settingSFD915Limit terminal settingSFD917Clear signal CLR output terminalReturning speed VH low 16		0
SFD912 Signal terminal state setting SFD914 Z phase terminal setting SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16		0
SFD914 Z phase terminal setting SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16		0
SFD914 Z phase terminal setting SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	Bit0: origin signal switch state	
SFD914 Z phase terminal setting SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	Bit1: Z phase switch state	
SFD914 Z phase terminal setting SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	Bit2: positive limit switch state	
SFD914 Z phase terminal setting SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	Bit3: negative limit switch state	0
SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	0: normally open(positive logic)	
SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	1: normally close(negative logic)	
SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	default is 0	
SFD915 Limit terminal setting SFD917 Clear signal CLR output terminal Returning speed VH low 16	Bit0~bit7: set X terminal, 0xFF is no	<u> </u>
SFD917 Clear signal CLR output terminal Returning speed VH low 16	terminal(interruption)	0xFF
SFD917 Clear signal CLR output terminal Returning speed VH low 16	Bit7~bit0: X terminal of positive	
SFD917 Clear signal CLR output terminal Returning speed VH low 16	limit, 0xFF is no terminal	
SFD917 terminal Returning speed VH low 16	Bit15~bit8: X terminal of negative	FFFF
SFD917 terminal Returning speed VH low 16	limit, 0xFF is no terminal	
SFD917 terminal Returning speed VH low 16	Bit0~Bit7: Y terminal, 0xFF is no	
Returning speed VH low 16	terminal	0xFF
CED010 Iterating speed villiow 10		
SFD918 bits		0
Returning speed VH high 16		
SFD919 bits		U
Crawling speed VC low 16		
SFD922 bits		0
Crawling speed VC high 16		<u> </u>
SFD923 bits		0
SFD919 Returning speed VH high 16 bits Crawling speed VC low 16		0

SFD924	Mechanical origin position low 16 bits		0	
	Mechanical origin position			-
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	
SFD932	Soft limit negative limit	Low 16 bits	0	
SFD933	value	High 16 bits	0	
		6	-	
•••				
SED050	Pulse default speed low 16		1000	G
SFD950	bits		1000	Group 1
SFD951	Pulse default speed high 16	It will send pulse with default speed	0	1
51 0 9 5 1	bits	when the speed is 0.	0	
SFD952	Pulse default speed		100	
51 0752	acceleration time		100	
SFD953	Pulse default speed		100	
~~~~~~	deceleration time			_
SFD954	Acceleration and		0	
	deceleration time			_
		Bit 1~0: acc/dec mode		
	ו ו ו ו	00: line		
SFD955	Pulse acceleration and deceleration mode	01: S curve	0	
	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	50	
	parameters	100 tick.		
OFFOCC	Follow feedforward		0	1
SFD963	compensation	0~100, percentage		

Note:

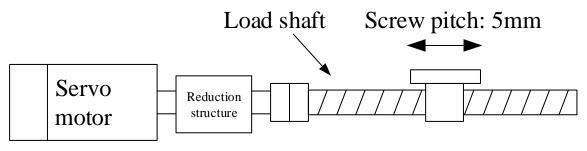
- ※1: As there are many configuration parameters of PLSR, we suggest to use software configuration table to set the parameters.
- *2: if user needs to set each segment pulse frequency and pulse numbers in the HMI, please configure through the configuration table first, then use instruction DMOV in the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

1 01 01101	-p		
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** 

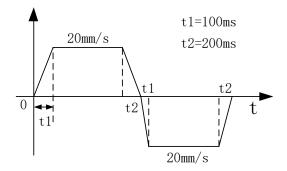
Pulse number per rotate = 
$$20000 = 2500 * 4 * \frac{2}{1}$$

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

## Pulse configuration

(1) Pulse segment configuration

multi section pulse output										
data start a	address:	HD0	user params	address:	HD100	system params:	K1	output:	YO	
mode:	[	relative v	start execut	e section count:	0	Config				
Add D	elete   Up	pwards Do	ownwards							
	f	frequence		pulse count		wait condition		wa regi		jump register
1		20		200	թվ	se sending comp	lete	K	D	KO
▶ 2		20		-200	թո	se sending comp	lete	K	D	KO
used space	: HDO-H	HD29,HD100	D-HD103		Read	From PLC Wri	te To PLC		ОК	Cancel

**Relative mode** 

data start mode:	address:	HD0		ams address:	HD100	system params:	K1	output:	YO	
mode:     absolut     start execute section count:     0     Config       Add     Delete     Upwards     Downwards										
	:	frequence		pulse count		wait condition		wa regi		jump register
1		20		200	թվ	se sending comp.	lete	K	)	KO
▶ 2		20		0	թվ	se sending comp.	lete	K	)	KO

#### 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)	Pulse frequency (#1)	20
HD12 (double	Pulse number (#1)	200
word)		200
	bit15~bit8: waiting condition (#1)	
	H00: pulse sending completion	
	H01: wait time	
HD14	H02: wait signal	0
11014	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 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/register no. (for iumn register)(#1)	0
(double word)	Constant value/register no. (for jump register)(#1)	0
HD+20	Dulas fragmentar (#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		0
(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

		Bit 1: pulse direction logic		Coi	
		0: positive logic 1: negative logic, default is 0		Common parameter	
			on p		
		Bit 2: use soft limit function			
		0: not use 1: use default is 0		mete	
		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	1792		
	······································	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				
	16 bits		20000		
SFD903	Pulse number/1 rotation high				
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	16 bits				
SFD904	Motion quantity/1 rotation				
512701	low 16 bits		10		
SFD905	Motion quantity/1 rotation		10		
	high 16 bits				
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		
	Gear clearance negative				
SFD909	compensation		0		
SFD910	Electrical origin low 16 bits		0		
SFD911	Electrical origin high 16 bits		0		
	Lieeureur origin ingir 10 olts		v		

r				1
		Bit0: origin signal switch state		
		Bit1: Z phase switch state		
		Bit2: positive limit switch state	0	
SFD912	Signal terminal state setting	Bit3: negative limit switch state		
		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	0xFF	
51 D / 14		terminal(interruption)	UALL	
		Bit7~bit0: X terminal of positive		
SFD915	Limit terminal setting	limit, 0xFF is no terminal	FFFF	
51 D 915		Bit15~bit8: X terminal of negative	1,1,1,1,	
		limit, 0xFF is no terminal		
SFD917	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no	0xFF	
SFD917	terminal	terminal	UXFF	
SFD918	Returning speed VH low 16		0	
560910	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	
5FD924	low 16 bits		0	
SFD925	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	
SFD932	Soft limit negative limit	Low 16 bits	0]
SFD933	value	High 16 bits	0	1
				1
	Pulse default speed low 16		20	G
SFD950	bits		20	Group 1
ann a t	Pulse default speed high 16	It will send pulse with default speed		р 1
SFD951	bits	when the speed is 0.	0	
	Pulse default speed	*		1
SFD952	acceleration time		100	

SFD953	Pulse default speed		200
~~~~~	deceleration time		
SFD954	Acceleration and		0
51 0754	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	

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).

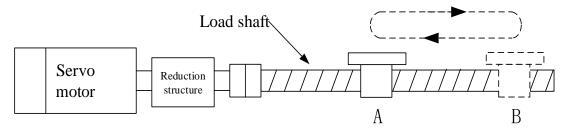
For example:

HD200	HD10	//HD200 set segment 1 pulse frequency in HMI
HD202	HD12	//HD202 set segment 1 pulse numbers in HMI
HD204	HD20	//HD204 set segment 2 pulse frequency in HMI
HD206	HD22	//HD206 set segment 2 pulse numbers in HMI
	HD202 HD204	HD200HD10HD202HD12HD204HD20HD206HD22

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.



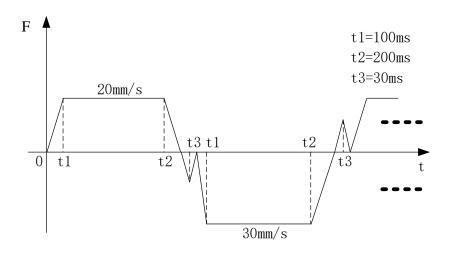
**Mechanical structure** 

We can calculate the following things:

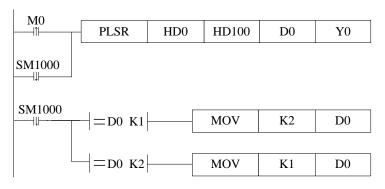
Pulse number per rotate=  $20000 = 2500 * 4 * \frac{2}{1}$ Moving quantity= pitch = 5mm  $20 \text{ mm/s} = \frac{20 \text{ mm}}{5 \text{ mm}} * 20000 = 80000 \text{ pulse/s}$  $30 \text{ mm/s} = \frac{30 \text{ mm}}{5 \text{ mm}} * 20000 = 120000 \text{ pulse/s}$ 

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

data start address: node:	HD0 user pa relative $\checkmark$ start ex	HD100 system params: K1 0 Config	output: Y0		
Add Delete	Upwards Downward	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
• 2	30	-200	pulse sending complete	KU	KU

Relative mode

data start ad		er params address:	HD100	system params:	К1	output:	YO	
node:	510	t execute section count:	0	Config				
Add Dei	ete Upwards Down			1. 11.1		wa	it	յատթ
	frequence	pulse count	,	wait condition		regi	ster	register
1	20	200	pul	se sending comp	lete	K	) (	KO
▶ 2	30	0	pulse sending complete		K	C	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)	Dulco	data	addraga	distribution	tabla	(relative mode)	
(J)	1 uise	uata	audicss	uisuibuilon	auto	(Icialive mode)	

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)	r uise 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		•
(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 settingBit 1: pulse direction logic 0: positive logic 1: negative logic, default is 01792SFD900Pulse parameter settingBit 2: use soft limit function 0: negative direction 1: positive direction 0: negative direction 1: positive direction default is 01792SFD900Pulse parameter settingBit 0: subse number 1: equivalent 000: pulse number 000: pulse number 0001: 1 um 011: 0.01mm 1111: 1 mm Default is 01792SFD901Pulse number/1 rotation logic 16 bitsBit 0: pulse sending mode 0: cross coordinate 1: polar coordinate mode, default is 00SFD903Pulse number/1 rotation high 16 bitsComplete mode 1: subsequence mode, default is 00SFD904Motion quantity/1 rotation high 16 bitsS5SFD905Gear clearance positive compensationY terminal no., 0xFF is no terminal 22SFD908Gear clearance positive compensationY terminal no., 0xFF is no terminal 22SFD904Electrical origin hugh 16 bits0SFD905Gear clearance positive compensation0SFD906Gear clearance positive compensation0SFD907Electrical origin hugh 16 bits0				1	
SFD901Pulse sending modeBit 0: pulse sending mode 0: 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 high 16 bitsY terminal no., 0xFF is no terminal 20SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Electrical origin low 16 bits0	SFD900	Pulse parameter setting	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 0: cross coordinate 1: polar coordinate	1792	Common parameter
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 terminal2SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD901	Pulse sending mode	Bit 0: 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 compensation0SFD910Electrical origin low 16 bits0	SFD902			20000	
SFD904I 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 compensation0SFD910Electrical origin low 16 bits0	SFD903	•		0	
SFD905high 16 bits0Nigh 16 bitsY terminal no., 0xFF is no terminal2SFD906Pulse direction terminalY terminal no., 0xFF is no terminal2SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD904	1 5		5	
SFD906Pulse direction terminalY terminal no., 0xFF is no terminal2SFD907Direction delay timeDefault is 20, unit: ms20SFD908Gear clearance positive compensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD905			0	
SFD908Gearclearancepositive compensation0SFD909Gearclearancenegative compensation0SFD910Electrical origin low 16 bits0	SFD906	-	Y terminal no., 0xFF is no terminal	2	
SFD908ompensation0SFD909Gear clearance negative compensation0SFD910Electrical origin low 16 bits0	SFD907	Direction delay time	Default is 20, unit: ms	20	
SFD9090compensation0SFD910Electrical origin low 16 bits0	SFD908	1		0	
	SFD909	e		0	
SFD911Electrical origin high 16 bits0	SFD910	Electrical origin low 16 bits		0	]
	SFD911	Electrical origin high 16 bits		0	

				<u> </u>
SFD912		Bit0: origin signal switch state		
	Signal terminal state setting	Bit1: Z phase switch state	0	
		Bit2: positive limit switch state		
		Bit3: negative limit switch state		
		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	0xFF	
		terminal(interruption)		
SFD915	Limit terminal setting	Bit7~bit0: X terminal of positive	FFFF	
		limit, 0xFF is no terminal		
		Bit15~bit8: X terminal of negative		
		limit, 0xFF is no terminal		
SFD917	Clear signal CLR output terminal	Bit0~Bit7: Y terminal, 0xFF is no	0xFF	
		terminal		
SFD918	Returning speed VH low 16		0	
	bits			
SFD919	Returning speed VH high 16		0	
	bits		0	
SFD922	Crawling speed VC low 16		0	
	bits		0	
SFD923	Crawling speed VC high 16		0	
	bits		0	
SFD924	Mechanical origin position		0	
SFD924	low 16 bits		0	
SFD925	Mechanical origin position		0	
	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 positive limit value	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
				1
SFD950	Pulse default speed low 16			G
	bits		20	Group 1
SFD951	Pulse default speed high 16	It will send pulse with default speed		5 1
	bits	when the speed is 0.	0	
SFD952	Pulse default speed	-	100	1
	acceleration time		100	
	acceleration time		100	

SFD953	Pulse default speed		200	
	deceleration time			4
SFD954	Acceleration and		30	
	deceleration time			_
		Bit 1~0: acc/dec mode		
		00: line		
SFD955	Pulse acceleration and	01: S curve	0	
	deceleration mode	10: sine curve		
		11: reserved		
255 A # (		Bit 15~2: reserved	- 0	_
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 0705	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	52
	Pulse default speed	when the speed is o.		_
SFD972	acceleration time		100	
	Pulse default speed			_
SFD973	deceleration time		200	
	Acceleration and		30	-
SFD974	deceleration time			
		Bit 1~0: acc/dec mode		1
		00: line		
	Pulse acceleration and	01: S curve		
SFD975	deceleration mode	10: sine curve	0	
		11: reserved		
		Bit 15~2: reserved		
SFD976	Max speed limit low 16 bits		50	1
SFD977	Max speed limit high 16 bits		0	1
SFD978	Initial speed low 16 bits		0	1
	-		0	1
SFD979	Initial speed high 16 bits		U	

SFD981	Stop speed high 16 bits		0
SFD982	Follow performance parameters	$1 \sim 100$ , 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 HI	HD10	HD200	DMOV
//HD202 set segment 1 pulse numbers in HM	HD12	HD202	DMOV
//HD204 set segment 2 pulse frequency in HI	HD20	HD204	DMOV
//HD206 set segment 2 pulse numbers in HM	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	XG1, XG2			
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

word	Operand			System						Constant	Mod	ule
		$D^*$	FD	$TD^*$	$CD^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	٠	•	•	•	•	•	•		
	C1	-	-							•		
	S1	•	•							•		
1.	51	•	•							•		
bit	Operand		•		Systen	n				•		
bit		•	• Y	M*	Systen S*	n T*	<b>C</b> *	Dnm				

### ■ 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.

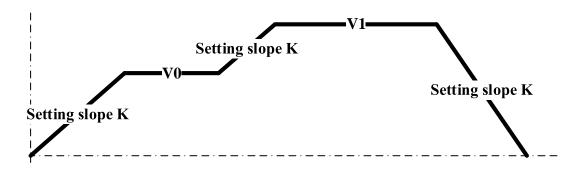
# Function and action

Instruction mode:

MO		<b>S</b> 0.	<b>S1</b> .	<u>D.</u>
	PLSF	HD0	K1	Y0
SM1000			_	
	RST	M0		

- Frequency range: 1Hz ~100KHz or -100KHz ~ -1Hz(XG1), 1Hz ~150KHz or -150KHz ~ -1Hz (XG2) (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

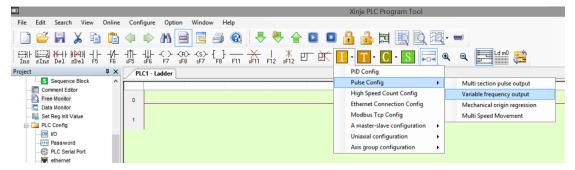
# **Output mode**



- The pulse output terminal is set in system parameters (refer to chapter 1-2-1-3)
- 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.

# **Instruction configuration**

Click pulse config/variable frequency output.



Configure the direction terminal in the common parameter, and configure the acceleration and deceleration time in the corresponding parameter block. This example uses the first set of parameters, that is, the acceleration and deceleration time is configured in the first set of parameters.

			variable free	quency out	put			×
Г	Pulse frequence address:	HDO	System params:	К1	Output:	YO		
			System params.		ouipui.			-
L	Pulse frequence(HZ):	0				Config		
	used space:		Read From F	PLC	e To PLC	ОК	Cancel	]

[Note]:

% 1: acceleration and deceleration time and default speed constitute the slope of acceleration and deceleration time. For example, the default speed is 1000Hz, and the acceleration and deceleration time is 10ms, that is, 10ms is required for every 1000Hz change in frequency until it changes to the set speed.

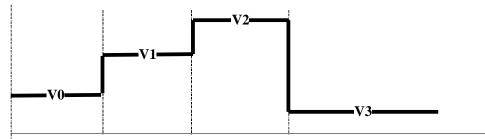
 $\approx$  2: the 1st-4th set of parameters cannot be modified frequently. If it needs to be modified frequently or the acceleration and deceleration time should be set on the touch screen, please use the 0th set of parameters, and the parameter address can be viewed in the software.

PLC1 - Pulse Set		X
Config - Delete   Initialize the   Configuration wizard		
Param SFD906	Value	^
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	Y no terminal	
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	normally on	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal terminal switch state setting	normally on	~
Read From PLC Write To PLC OF	( Cancel	

PLC1 - Pulse Set		2
Config 🝷 Delete   Initialize the   Configuration wizard		
Param HSD460(Double word)	Value	^
YO axis-Common-Positioning completion time limit (ms	0	
YO axis-Common-Fast locate instruction default param	1	
YO axis-Common-Interpolation instruction default par	2	
YO axis-group O-Pulse default speed	1000	
YO axis-group O-Acceleration time of Pulse default s	10	
YO axis-group O-Deceleration time of pulse default s	10	
YO axis-group O-Acceleration and deceleration time (ms)	10	
YO axis-group O-pulse acc/dec mode	linear acc/	/dec
YO axis-group O-Max speed	100000	
YO axis-group O-Initial speed	0	
YO axis-group O-stop speed	0	~
Read From PLC Write To PLC OF	( (	Cancel

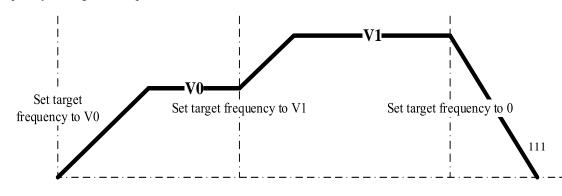
# Switching mode analysis

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

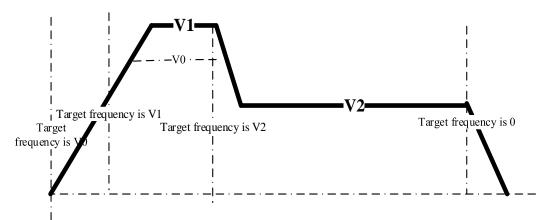


(B) Pulse default speed acceleration deceleration time is not 0

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

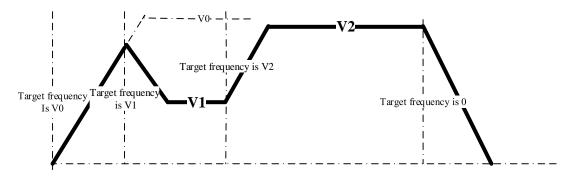


(2) the pulse is not in stable segment when user setting new frequency, it will switch to setting frequency through the slope. (present setting frequency > last time setting frequency, takes present setting frequency as target).



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).

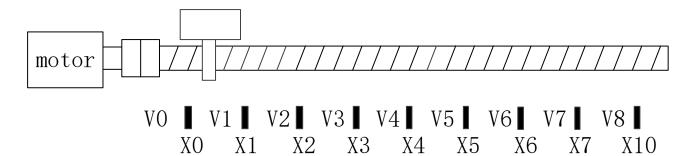


User set target frequency V1 (V1<V0, V1<present frequency) before reaching setting frequency V0, at this time, it will go to new setting frequency V1 as the down slope.

# Example 1

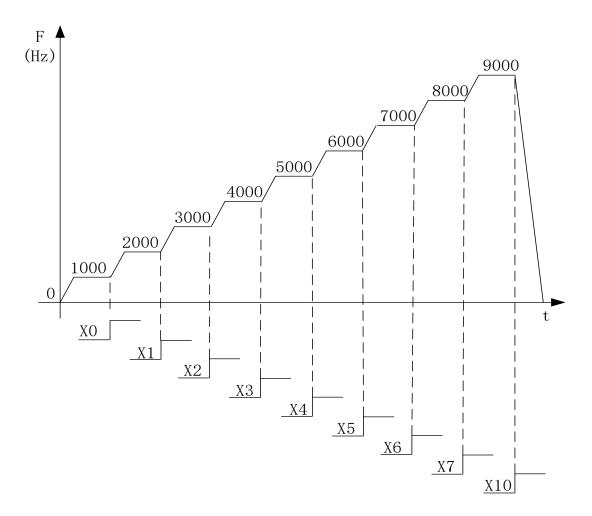
As below diagram, the working table needs to move from left to right position X10. Now the position X0 to X10 all installed proximity switch. The speed from left to X0 is V0, X0 to X1 speed is V1, X1 to X2 speed is V2, X2 to X3 speed is V3, X3 to X4 speed is V4, X4 to X5 speed is V5, X5 to X6 speed is 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	r		ſ	
		DMOV	K1000	HD0 –
<b>M</b> 0				
	- PLSF	HD0	K1	Y0 —
X0	г			
		DMOV	K2000	HD0 —
X1	ſ			
ſî		DMOV	K3000	HD0 –
X2	ſ			
		DMOV	K4000	HD0 —
X3	ſ			
		DMOV	K5000	HD0 –
X4	ſ		· · · ·	
î		DMOV	K6000	HD0 —
X5	ſ			
		DMOV	K7000	HD0 —
X6	L			
î		DMOV	K8000	HD0 -
X7	L ,		 	
[1]		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		OIL	Cancer

(2) System parameter configuration (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

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	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		Con
		0: positive logic 1: negative logic,		Common parameter
		default is 0		on pa
		Bit 2: use soft limit function		aran
		0: not use 1: use default is 0	nete	nete
		Bit 3: mechanical return to origin		T
		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		
	D 1 1 /1 / 1	mode, default is 0		
SFD902	Pulse number/1 rotation low		0	
	16 bits			_
SFD903	Pulse number/1 rotation high		0	
	16 bits			
SFD904	Motion quantity/1 rotation		0	
	low 16 bits			
SFD905	Motion quantity/1 rotation		0	
	high 16 bits			
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	
	compensation			
SFD909	Gear clearance negative		0	
	compensation			
SFD910	Electrical origin low 16 bits		0	
SFD911	Electrical origin high 16 bits		0	

		Bit0: origin signal switch state		
		Bit1: Z phase switch state		
		Bit2: positive limit switch state		
SFD912 S	Signal terminal state setting	Bit3: negative limit switch state	0	
		0: normally open(positive logic)		
		1: normally close(negative logic)		
		default is 0		
SFD914 Z	Z phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no	0xFF	
51 D 9 1 4 2	z phase terminar setting	terminal(interruption)	UALL	
		Bit7~bit0: X terminal of positive		
SFD915 I	Limit terminal setting	limit, 0xFF is no terminal	FFFF	
51 D 915	Linnt terminal setting	Bit15~bit8: X terminal of negative	1,1,1,1,	
		limit, 0xFF is no terminal		
SFD917	Clear signal CLR output	Bit0~Bit7: Y terminal, 0xFF is no	0xFF	
srD917	terminal	terminal	ΟΧΓΓ	
SFD918	Returning speed VH low 16		0	
5FD918	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	
3rD924	low 16 bits		0	
SFD925	Mechanical origin position		0	
3FD923	high 16 bits		0	
SFD926 2	Z phase numbers		0	
SFD927 (	CLR signal delay time	Default 20, unit: ms	20	
SFD928 (	Grinding wheel radius(polar	Low 16 bits	2	
SFD929 0	coordinate)	High 16 bits	0	
SFD930	Soft limit positive limit1	Low 16 bits	0	
SFD931	Soft limit positive limit value	High 16 bits	0	
SFD932 S	Soft limit negative limit	Low 16 bits	0	
SFD933 v	value	High 16 bits	0	]
				1
•••				
	Pulse default speed low 16		1000	G
SFD950	bits		1000	Group 1
I	Pulse default speed high 16	It will send pulse with default speed	0	0 1
SFD951	bits	when the speed is 0.	0	
	Pulse default speed	<b>^</b>		1
SFD952			100	1

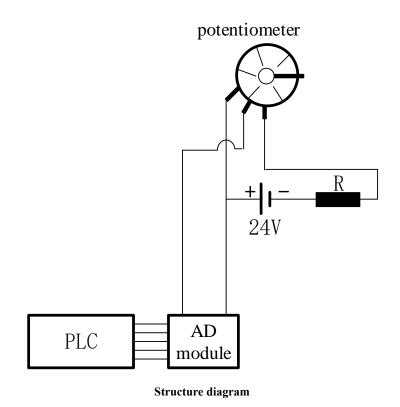
050.50	Pulse default speed		100
SFD953	deceleration time		100
SFD954	Acceleration and		0
SFD934	deceleration time		
		Bit 1~0: acc/dec mode	
		00: line	
SFD955	Pulse acceleration and	01: S curve	0
SFD955	deceleration mode	10: sine curve	0
		11: reserved	
		Bit 15~2: reserved	
SFD956	Max speed limit low 16 bits		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
	Follow performance	$1 \sim 100$ , 100 means the time constant is	0
SFD962	· · · · · · · · · · · ·	one tick, 1 means the time constant is	
	parameters	100 tick.	
SFD963	Follow feedforward		0
350903	compensation	0~100, percentage	
•••			

Note:

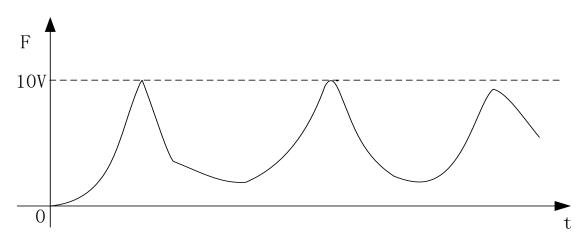
※ 1: As there are many configuration parameters of PLSF, we suggest to use software configuration table to set the parameters.

# 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.

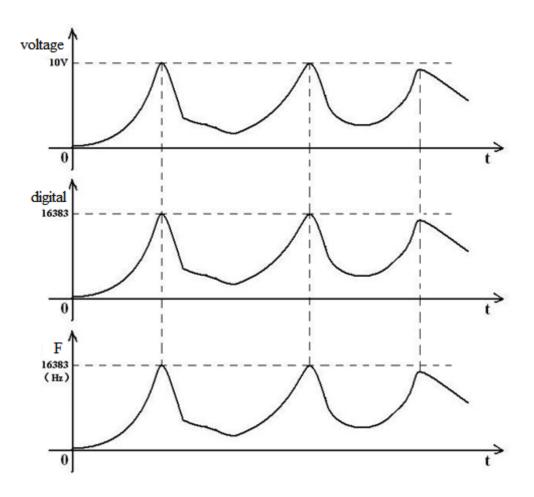


For example: the output signal of potentiometer is shown as below:



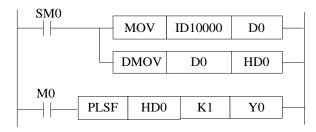
voltage signal diagram

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 frequency output							×
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	

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	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

(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:

※ 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 sin	Relative single segment positioning [DRVI]						
16-bit	-	32-bit	DRVI				
instruction		instruction					
Execution	Rising/falling edge coil	Suitable	XG1, XG2				
condition		model					
Hardware	V3.3.1 and up	Software	V3.3 and up				

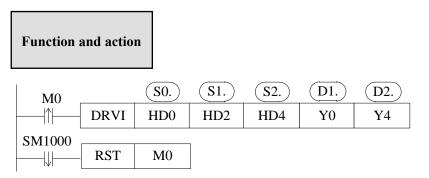
# Operand

Operand	Function	Туре
S0	Pulse numbers or soft component address	32-bit, BIN
S1	Pulse frequency or soft component address	32-bit, BIN
S2	Pulse acceleration/deceleration time or soft	16-bit, BIN
	component address	
D0	Pulse output terminal	Bit
D1	Pulse direction terminal	Bit

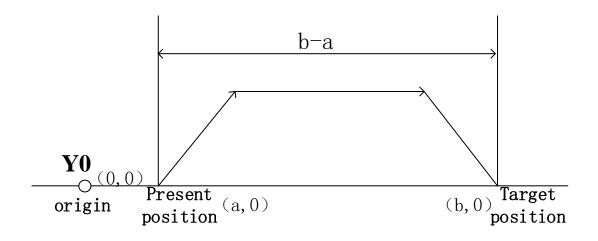
Vord	Operand		System								Constant	Modu	ıle
		$D^*$	FD	) TI	<b>)</b> *	$\mathrm{CD}^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	•		•	•	•	•	•	•		
	S1	•	•	•		•	•	•	•	•	•		
	S2	•	•	•		•	•	•	•	•	•		
	Operand				Syst	em							
Bit		Х	Y	M*	S*	T*	C*	Dn.m					
	D1		•										
	D2		•										

# Suitable soft component

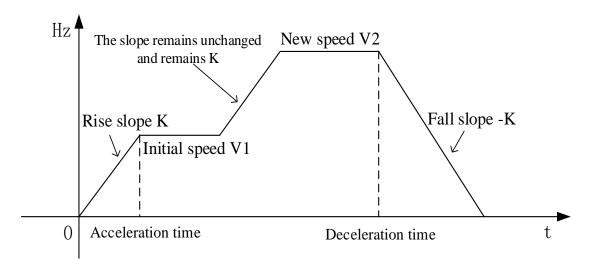
*Note: D means D, HD. TD means TD, HTD. CD means CD, HCD, HSCD, HSD. DM means DM, DHM. DS means DS, DHS. M means M, HM, SM. S means S, HS. T means T, HT. C means C, HC.



- Pulse frequency output range:1Hz ~100KHz (XG1), 1Hz ~150KHz (XG2) (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.

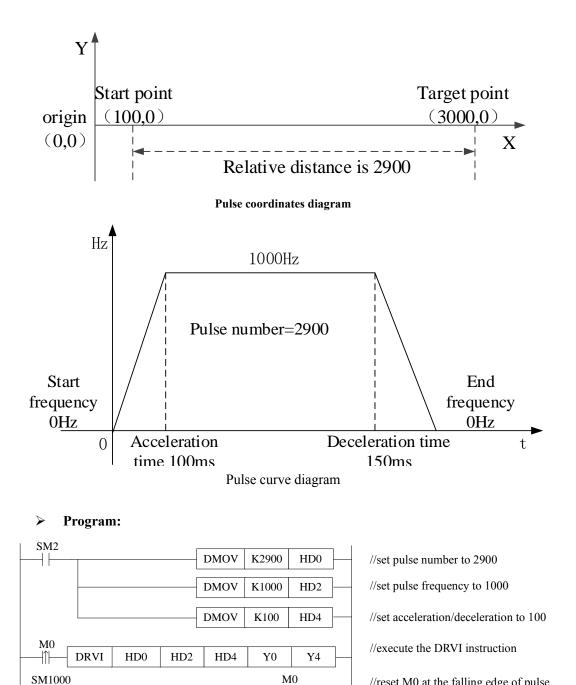


- The pulse number is accumulated in register HSD0 (double word).
- The pulse frequency can be real-time changed when the instruction is executing, the new frequency will be effective at once. (PLC firmware v3.4.5 and up can support)
- Acceleration and deceleration time and output pulse frequency determine the pulse rise/fall slope. Generally, the acceleration time and deceleration time are the same. However, if the pulse frequency is modified during the execution of the command, it will accelerate / decelerate to the new pulse frequency according to the first rise / fall slope, and will decelerate to 0 according to the first fall slope at the end of the pulse.



- 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.

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:



( R

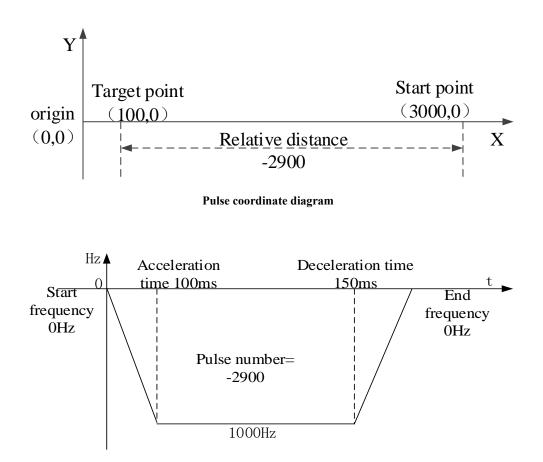
)

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

### Example 2

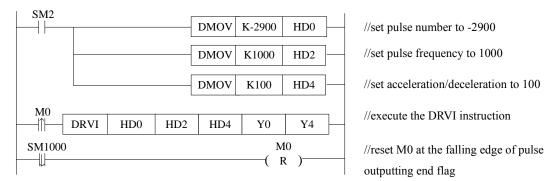
╢

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 relative distance from target position 100 to present position 3000 is 100-3000=-2900. The execution diagram of DRVI is shown as below:



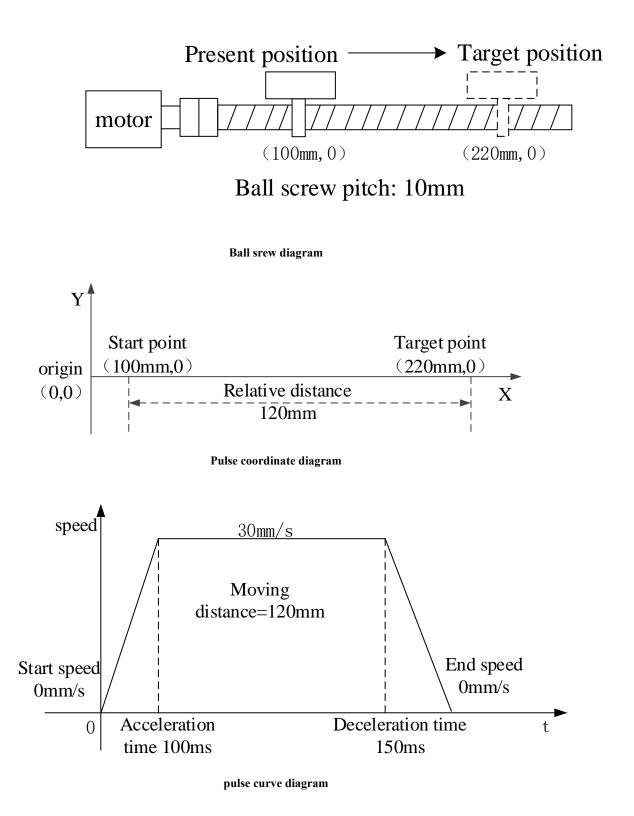
Pulse curve diagram

> Program:

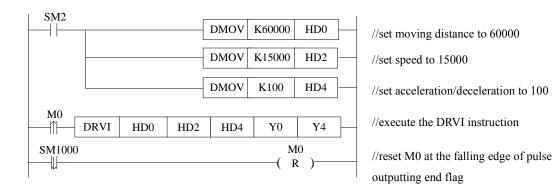


### **Example 3**

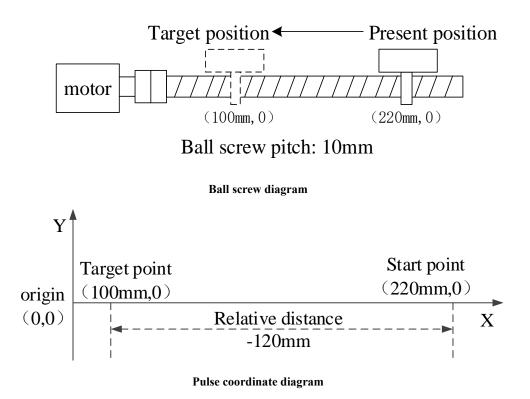
There is a ball screw workbench, the motor has 5000 pulses per circle, X axis present coordinate is (100mm, 0), start speed and end speed is 0mm/s, it needs to reach the target position (220mm, 0) with the speed 15000 (30mm/s), the pulse output terminal is Y0, pulse direction terminal is Y4,as the accumulated 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:

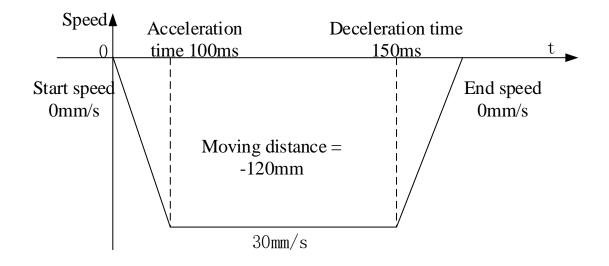


> Program:



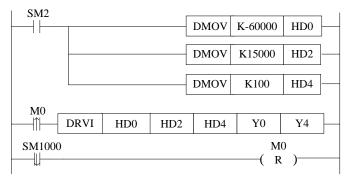
There is a ball screw workbench, the motor has 5000 pulses per circle, X axis present coordinate is (220mm, 0), start speed and end speed is 0mm/s, it needs to reach the target position (100mm, 0) with the speed 15000 (30mm/s), the pulse output terminal is Y0, pulse direction terminal is Y4, as the accumulated 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:











//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	Absolute single-segment positioning [DRVA]						
16-bit	-	32-bit	DRVA				
instruction		instruction					
Execution	Rising/falling edge of the coil	Suitable	XG1, XG2				
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 address	16-bit, BIN
D0	Pulse output terminal	Bit
D1	Pulse output direction	Bit

# 3. Suitable soft component

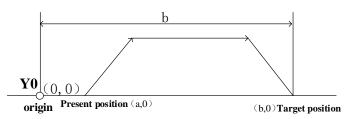
ord	Operand		System						Constant	Moc	lule		
		$D^*$	FD	TL	)*	$CD^*$	DX	DY	DM*	$DS^*$	K/H	$\mathbb{D}$	QD
	S0	•	•	•		•	•	•	•	•	•		
	S1	•	•	•		•	•	•	•	•	•		
	S2	•	•	•		•	•	•	•	•	•		
it	S2 Operand	•	•	•	Sy	• stem	•	•	•	•	•		
t	[	• X	• Y	• M*	Sy S*		• C*	• Dnm		•	•		
	[				-	stem				•	•		

*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.

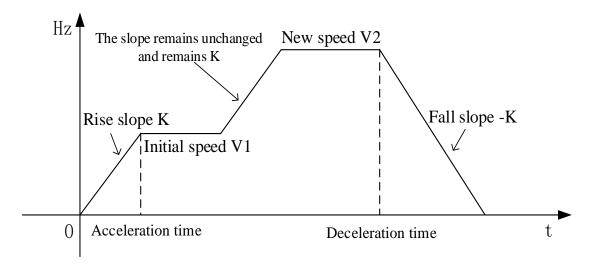
# Function and action

	M0		<b>S0</b> .	<b>S</b> 1.	S2.	(D1.)	D2.
+	↑	DRVA	HD0	HD2	HD4	Y0	Y4
	SM1000						
+	↓	RST	M0				

- Pulse frequency output range:1Hz ~100KHz (XG1), 1Hz ~150KHz (XG2) (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.
- Absolute driving mode: move from the origin point (the distance between origin position and target position), origin point is the reference point.

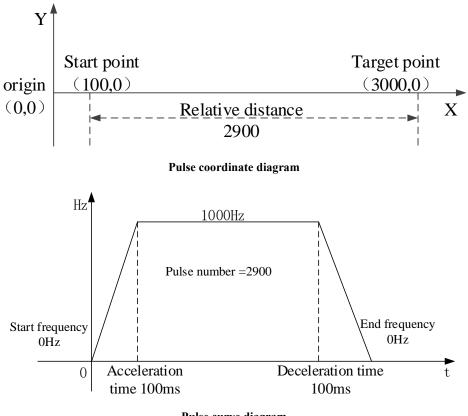


- DRVA does not use the system parameter block configuration mode, if the public and the first set of parameters (except the deceleration parameters) are configured, they will be effective for DRVA.
- The pulse number is accumulated in register HSD0 (double word).
- The pulse frequency can be real-time changed when the instruction is executing, the new frequency will be effective at once. (PLC firmware v3.4.5 and up can support)
- Acceleration and deceleration time and output pulse frequency determine the pulse rise / fall slope. Generally, the acceleration time and deceleration time are the same. However, if the pulse frequency is modified during the execution of the command, it will accelerate / decelerate to the new pulse frequency according to the first rise / fall slope, and will decelerate to 0 according to the first fall slope at the end of the pulse.



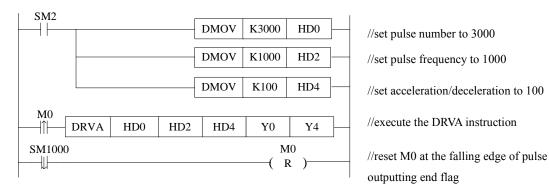
- The direction of absolute positioning instruction depends on whether the target position is larger than present position, if the target position is larger than present position(the target position is on the right of present position on the axis), the pulse is sent in forward direction and the accumulative 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.

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:

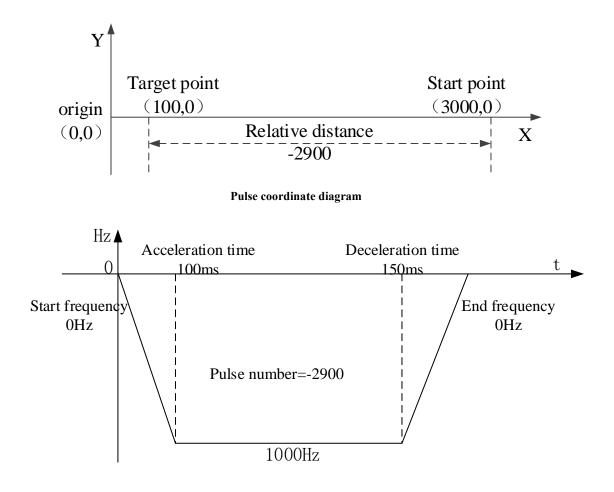


Pulse curve diagram

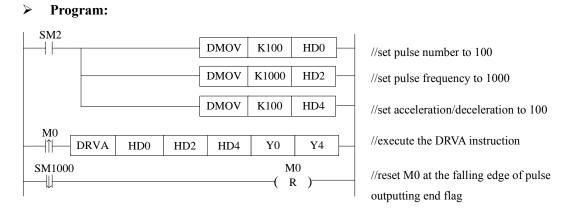
> Program:



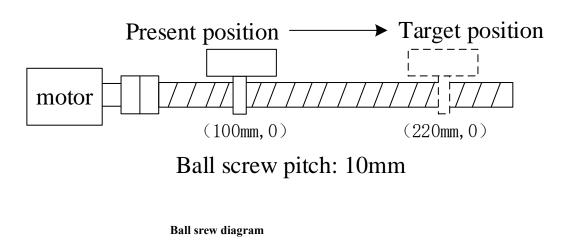
X axis present coordinates is (3000, 0), it needs to move to target position (100, 0) with the speed 1000Hz, start frequency and end frequency is 0Hz, pulse output terminal is Y0, direction terminal is Y4. As HSD0(dword) present value is 3000, the target position is 100, present position is 3000, the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

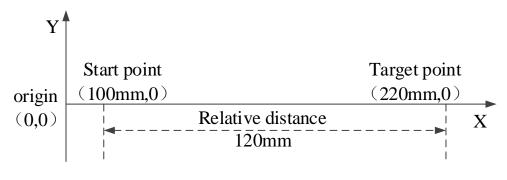


### Pulse curve diagram

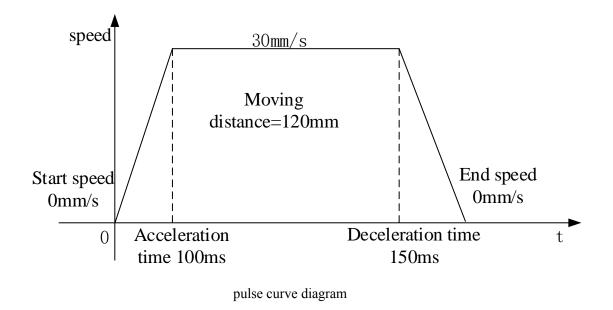


There is a ball screw workbench, the motor has 5000 pulses per circle, X axis present coordinate is (100mm, 0), start speed and end speed is 0mm/s, it needs to reach the target position (220mm, 0) with the speed 15000 (30mm/s), the pulse output terminal is Y0, pulse direction terminal is Y4, as the accumulated 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:

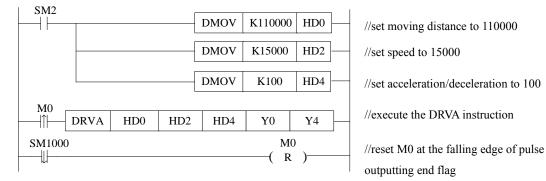




Pulse coordinate diagram

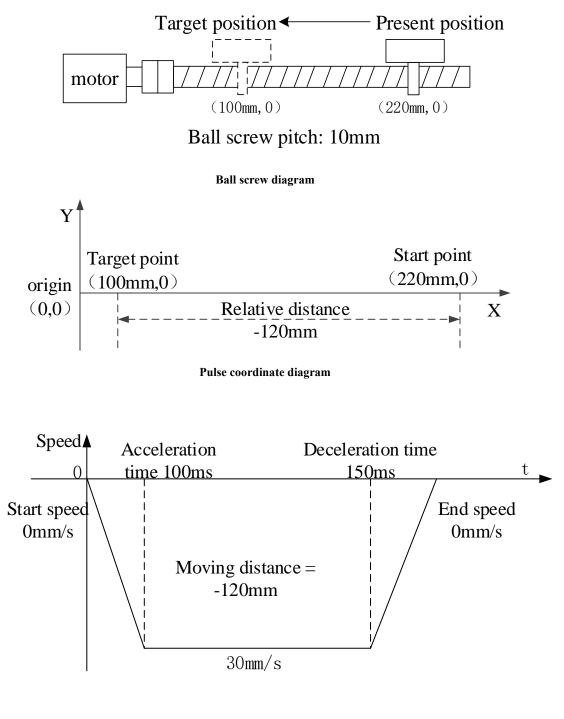


> Program:



# 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 DRVA is shown as below:



Pulse curve diagram

# > Program:

SM2		[	DMOV	K50000	HD0
		[	DMOV	K15000	HD2 —
		[	DMOV	K100	HD4
M0	HD0	HD2	HD4	Y0	Y4
SM1000		<u>.</u>	·	( 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	Mechanical origin return [ZRN]						
16-bit		32-bit	ZRN				
instruction		instruction					
Execution	Rising/falling edge of the coil	Suitable	XG1, XG2				
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

vord	Operand					System	m				Constant	Module	
		$D^*$	FD	$TD^*$	С	'D* 1	DX	DY	DM*	$DS^*$	K/H	D	QD
	S	•	•	•	•		•	•	•	•	•		
<b>D</b> ¹													
Bit	Operand				Syst	tem							·
Bit	Operand	X	Y	M*		1	C*	Dnn	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	and action		
M0		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:

		Xinje PLC Program Tool	
File Edit Search View Online O	onfigure Option Window Help		
🗋 😅 📕 👗 🖻 🖺 🤇	• 🔶 🗛 📄 🖬 🎒 🚱 🤘	🗏 🦣 🕤 🔍 🚨 🔒 🗮 🛄	- 100
H [1] [1] [1] [1] [1] [1] [1] [1] [1] [1]	+ +↓↓+ -< > - <r><s> { }</s></r>	É   ∦ ET ÈK <mark>II • II • C • S</mark> 🗔	a a 🔡 ld m0 💏
Project 🛛 🗘 🗙	PLC1 - Ladder	PID Config	
Project		Pulse Config	Multi section pulse output
PLC1	MO	High Speed Count Config	Variable frequency output
Ladder		Ethernet Connection Config	Mechanical origin regression
Function Library		Modbus Tcp Config	Multi Speed Movement
Default Library		A master-slave configuration	
Config Block		Uniaxial configuration	
Comment Editor		Axis group configuration	
	Mechanical o	prigin regression(ZRN)	
	System params: K1	Output: Y0	
		Pulse config	
		OK Cancel	

Please configure the origin direction, pulse direction terminal, origin signal, positive/negative limit in the common parameters.

PLC1 - Pulse Set		
Config - Delete   Initialize the   Configuration wizard		
Param SFD900 bit3	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 t	negative	
YO axis-Common-Parameters setting-Motor operating mode	Position Mode	
YO axis-Common-Parameters setting-Pulse unit	pulse number	
YO axis-Common-Parameters setting-Pulse type	One-way pulse	
YO axis-Common-Parameters setting-Interpolation coordi	Cross coordi	
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-Offset (1)	1	ы
<pre></pre>		Ŧ
Read From PLC Write To PLC OK	Cancel	
PLC1 - Pulse Set	Cancel	>
PLC1 - Pulse Set		
PLC1 - Pulse Set Config - Delete   Initialize the   Configuration wizard Param SFD906	Value	
PLC1 - Pulse Set Config - Delete   Initialize the   Configuration wizard Param SFD906 YO axis-Common-Parameters setting-Pulse unit	Value pulse number	>
PLC1 - Pulse Set Config - Delete   Initialize the   Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type	Value pulse number One-way pulse	>
PLC1 - Pulse Set Config - Delete   Initialize the   Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi	Value pulse number One-way pulse Cross coordi	
PLC1 - Pulse Set Config - Delete   Initialize the   Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi Y0 axis-Common-pulse send mode	Value pulse number One-way pulse Cross coordi complete mode	
PLC1 - Pulse Set Config - Delete Initialize the Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi Y0 axis-Common-Pulse num (1)	Value pulse number One-way pulse Cross coordi complete mode 1	
PLC1 - Pulse Set Config - Delete Initialize the Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi Y0 axis-Common-Pulse send mode Y0 axis-Common-Pulse num (1) Y0 axis-Common-Offset (1)	Value pulse number One-way pulse Cross coordi complete mode 1	
PLC1 - Pulse Set Config - Delete Initialize the Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi Y0 axis-Common-Pulse send mode Y0 axis-Common-Pulse num (1) Y0 axis-Common-Offset (1) Y0 axis-Common-Pulse direction terminal	Value pulse number One-way pulse Cross coordi complete mode 1 1 Y no terminal	
PLC1 - Pulse Set Config - Delete Initialize the Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi Y0 axis-Common-Pulse send mode Y0 axis-Common-Pulse num (1) Y0 axis-Common-Offset (1) Y0 axis-Common-Pulse direction terminal Y0 axis-Common-Delayed time of pulse direction (ms)	Value pulse number One-way pulse Cross coordi complete mode 1 1 Y no terminal 10	
PLC1 - Pulse Set Config - Delete Initialize the Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi Y0 axis-Common-Pulse send mode Y0 axis-Common-Pulse num (1) Y0 axis-Common-Pulse direction terminal Y0 axis-Common-Pulse direction terminal Y0 axis-Common-Delayed time of pulse direction (ms) Y0 axis-Common-Gear clearance positive compensation	Value pulse number One-way pulse Cross coordi complete mode 1 1 Y no terminal 10 0	
PLC1 - Pulse Set Config - Delete Initialize the Configuration wizard Param SFD906 Y0 axis-Common-Parameters setting-Pulse unit Y0 axis-Common-Parameters setting-Pulse type Y0 axis-Common-Parameters setting-Interpolation coordi Y0 axis-Common-Pulse send mode Y0 axis-Common-Pulse num (1) Y0 axis-Common-Offset (1) Y0 axis-Common-Pulse direction terminal Y0 axis-Common-Delayed time of pulse direction (ms)	Value pulse number One-way pulse Cross coordi complete mode 1 1 Y no terminal 10	

PLC1 - Pulse Set		×
Config - Delete   Initialize the   Configuration wizard		
Param SFD913 bit0-bit7	Value	^
YO axis-Common-Electrical origin position	0	
YO axis-Common-signal terminal switch state setting-Far-p	normally on	
YO axis-Common-signal terminal switch state setting-Z pha	normally on	
YO axis-Common-signal terminal switch state setting-posit	normally on	
YO axis-Common-signal terminal switch state setting-negat	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	
YO axis-Common-Zero clear CLR output setting	Y no terminal	1
<	>	~
Read From PLC Write To PLC OK	Cancel	

The regression speed VH and crawling speed VC can be configured in the common parameter value or in the parameter block specified in the instruction. The acceleration and deceleration time is configured in the specified parameter block. This example specifies that the system parameter block is K1, which is configured in the first set of parameter blocks.

Note:

%1: when VH and VC in the parameter block are configured, the value in the parameter block is used. When not configured in the parameter block, VH and VC in common parameters are used. If it is configured at the same time, it will be executed according to the configuration in the parameter block.

 $\approx$ 2: if you need to modify VH, VC or acceleration and deceleration time frequently, please use the 0 set of parameters.

 $\times$ 3: acceleration and deceleration time and default speed constitute the slope of acceleration and deceleration time. For example, the default speed is 1000Hz, and the acceleration and deceleration time is 10ms, that is, 10ms is required for every 1000Hz change in frequency until it changes to the set speed.

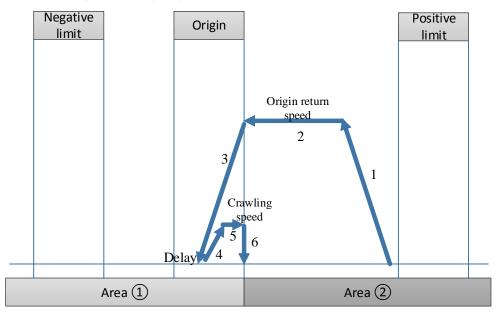
PLC1 - Pulse Set		×
Config • Delete   Initialize the   Configuration wizard		
Param SFD913 bit0-bit7	Value	^
YO axis-Common-Far-point signal terminal setting	X no terminal	
YO axis-Common-Z phase terminal setting	X no terminal	
YO axis-Common-positive limit terminal setting	X no terminal	
YO axis-Common-negative limit terminal setting	X no terminal	
YO axis-Common-Zero clear CLR output setting	Y no terminal	
YO axis-Common-Return speed VH (invalid)	0	
YO axis-Common-Creeping speed VC(invalid)	0	
YO axis-Common-Mechanical zero position	0	
YO axis-Common-Z phase num	0	
YO axis-Common-CLR signal delayed time (ms)	20	
<	- >	~
Read From PLC Write To PLC OK	Cancel	

PLC1 - Pulse Set		×
Config - Delete   Initialize the   Configuration wizard		
Param SFD913 bit0-bit7	Value	^
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	
YO axis-group 1-FOLLOW forward compensation(0-100)	0	
YO axis-group 1-Pulse frequency refresh time	1 ms re	fresh
YO axis-group 1-ZRN regression velocity VH	0	
YO axis-group 1-ZRN crawl speed VC	0	
YO axis-group 2-Pulse default speed	1000	
YO axis-group 2-Acceleration time of Pulse default speed	10	
<		>
Read From PLC Write To PLC OK	С	ancel

Param SFD913 bit0-bit7	Value	^
YO axis-group O-ZRN regression velocity VH	0	
YO axis-group O-ZRN crawl speed VC	0	
YO axis-group 1-Pulse default speed	1000	_
YO axis-group 1-Acceleration time of Pulse default speed	. 10	_
YO axis-group 1-Deceleration time of pulse default speed	. 10	
YO axis-group 1-Acceleration and deceleration time (ms)	10	
YO axis-group 1-pulse acc/dec mode	linear acc/de	20
YO axis-group 1-Max speed	100000	-
YO axis-group 1-Initial speed	0	_
YO axis-group 1-stop speed	0	-
< · · · · · · · · · · · · · · · · · · ·		. `

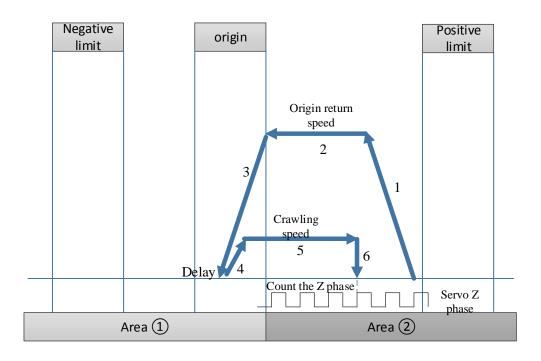
After configured all the parameters, click write to PLC and ok.

• 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:



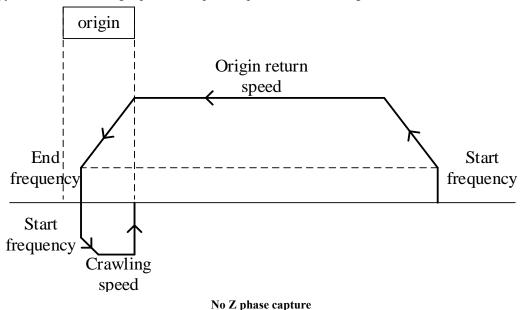
## • Mechanical origin return movement

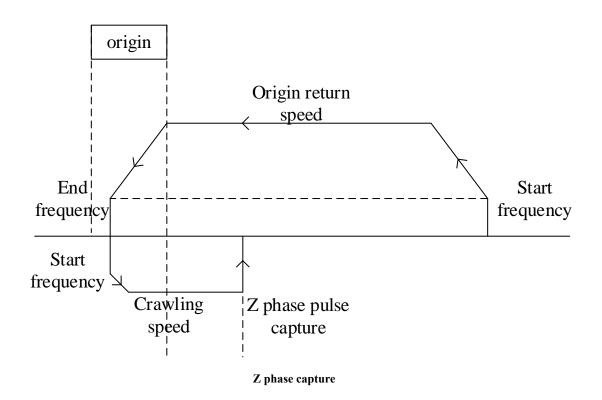
(1) when the origin return starts, it accelerates as the acceleration slope, after reaching the origin return speed, it will move towards origin return direction with this speed.

(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	1
···· · · · · · · · · · · · · · · · · ·		~
Read From PLC Write To PLC OK 0	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 model	Pulse channel	Pulse output terminal	Max output frequency	Output mode	Output format
XG1-16T4	4 axes	Y0, Y1, Y2, Y3	0~100KHz	Open collector	Pulse+direction
XG2-26T4	4 axes	Y0, Y1, Y2, Y3	0~150KHz	Open collector	Pulse+direction

Pulse output terminal configuration table:

# Note:

1: PLC can output 200 KHz pulses, but we cannot sure that all servo is running, please connect 500  $\Omega$  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:

Common-Parameters setting-Pulse unit       pulse number         Common-Parameters setting-Interpolation coordinates mode       Cross coordi         Common-Parameters setting-Interpolation coordinates mode       complete mode         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)       Yno terminal         Y0       Y1         Common-Gear clearance positive compensation       Y1         Y2       Y3         Common-Electrical origin position       Y4	Config 👻 Delete 🛛 init axis 📄 config guide		
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) Y14 • Common-Gear clearance positive compensation Y1 Common-Gear clearance negative compensation Y3 Common-Electrical origin position Y6	FD906	Value	,
Common-pulse send modecomplete modeCommon-Pulse num (1)1Common-Offset (1)1Common-Pulse direction terminalY14Common-Delayed time of pulse direction (ms)Yno terminal Y0Common-Gear clearance positive compensationY1 Y2 Y3 Y4 Y5Common-Electrical origin positionY0 Y4 Y5	Common-Parameters setting-Pulse unit	pulse number	
Common-Fulse num (1) 1 Common-Offset (1) 1 Common-Pulse direction terminal Y14 • Common-Delayed time of pulse direction (ms) Y14 • Common-Delayed time of pulse direction (ms) Y100 terminal Y0 Common-Gear clearance positive compensation Y1 Y2 Common-Gear clearance negative compensation Y3 Common-Electrical origin position Y6	Common-Parameters setting-Interpolation coordinates mode	Cross coordi	
Common-Offset (1) 1 Common-Pulse direction terminal Y14 • Common-Delayed time of pulse direction (ms) Y14 • Common-Gear clearance positive compensation Y1 Common-Gear clearance negative compensation Y3 Common-Electrical origin position Y4 Y5	Common-pulse send mode	complete mode	
Common-Pulse direction terminal       Y14         Common-Delayed time of pulse direction (ms)       Y no terminal         Y0       Y0         Common-Gear clearance positive compensation       Y1         Common-Gear clearance negative compensation       Y2         Common-Electrical origin position       Y4	Common-Pulse num (1)	1	
Common-Delayed time of pulse direction (ms) Common-Gear clearance positive compensation Common-Gear clearance negative compensation Common-Electrical origin position Y0 Y1 Y2 Y2 Y3 Y4 Y5	Common-Offset (1)	1	
Common-Delayed time of pulse direction (ms) YO Common-Gear clearance positive compensation Y1 Common-Gear clearance negative compensation Y3 Common-Electrical origin position Y4 YO	Common-Pulse direction terminal	Y14	•
Common-Gear clearance positive compensation Y1 Common-Gear clearance negative compensation Y3 Common-Electrical origin position Y4 Y4	Common-Delayed time of pulse direction (ms)		^
Common-Gear clearance negative compensation Y3 Common-Electrical origin position Y5	Common-Gear clearance positive compensation	Ý1	
Common-Electrical origin position Y5	Common-Gear clearance negative compensation		
	Common-Electrical origin position		
< Y7	· · · · · · · · · · · · · · · · · · ·	Y6	`
	Read From PLC Write To PLC OK	Y11	

Origin direction setting of mechanical origin returning:

PLC1 - Pulse Set		×
Config 👻 Delete   init axis   config guide		
FD900 bit3	Value	>
Common-Parameters setting-Pulse direction logic	positive logic	
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	

## **Clear output signal CLR**

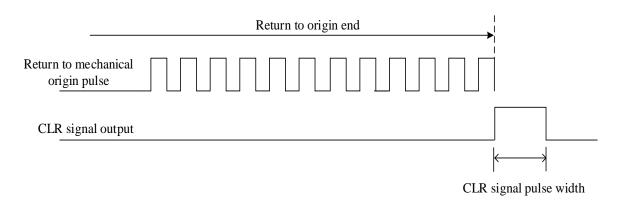
CLR signal setting, to output an output signal immediately after the end of returning to the mechanical origin, this signal can be sent to some other control equipment to achieve the purpose of rapid information transmission between each other. For example, after returning to the mechanical origin, the 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	1
nmon-Z phase terminal setting	X no terminal	1
nmon-positive limit terminal setting	X no terminal	1
nmon-negative limit terminal setting	X no terminal	1
nmon-Zero clear CLR output setting	Y no terminal	
nmon-Return speed VH	0	
nmon-Creeping speed VC	0	1
nmon-Mechanical zero position	0	
< -	-	1 🗸
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:

PLC1 - Pulse Set		×
Config - Delete   init axis   config guide		
927	Value	^
nmon-Zero clear CLR output setting	Y no terminal	
nmon-Return speed VH	0	
nmon-Creeping speed VC	0	
nmon-Mechanical zero position	0	
nmon-Z phase num	0	
nmon-CLR signal delayed time (ms)	20	
nmon-grinding wheel radius(polar Interpolation)	0	
nmon-soft limit positive value	0	
nmon-soft limit negative value	0	
nmon-encoder pulse number/1 rotate(closed-loop pulse)	1	
<	1.	
Read From PLC Write To PLC OK	Cancel	



#### CLR signal diagram

## Note:

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

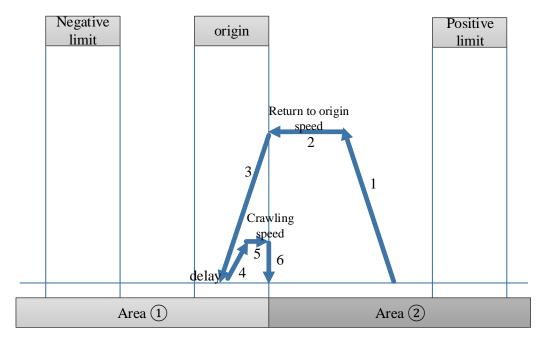
2. Do not set the delay time of CLR signal too small, or the servo driver may be unable to receive the CLR signal.

# 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.

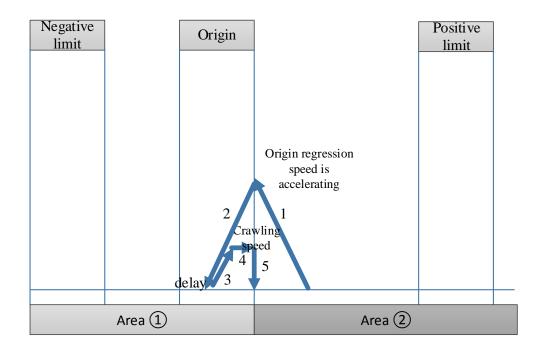
(2) When encountering the rising edge of the mechanical origin signal, slow down with the set deceleration slope until the deceleration to complete rest (frequency =0).

(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.

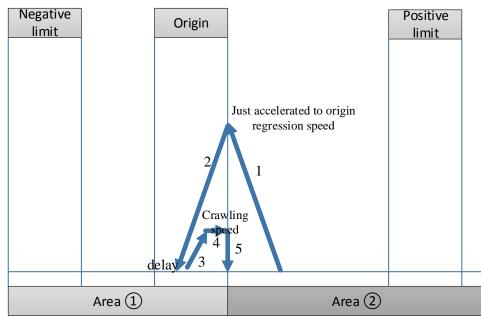
#### Special case 1:

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.



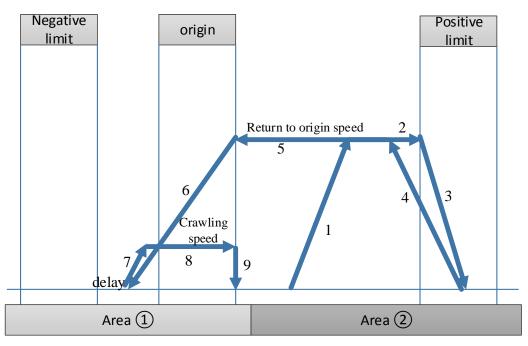
Note:

%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.

 $\approx$ 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).

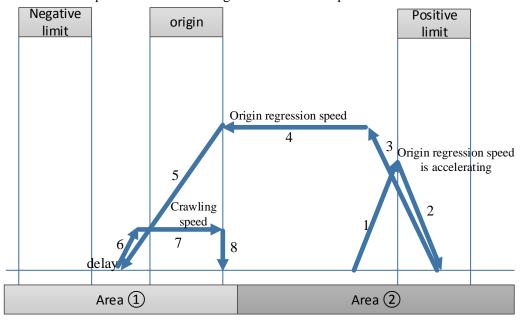
(5) delay (direction delay time in SFD), and then accelerate as the set acceleration slope, move forward until reaching the crawling speed, when leaving the mechanical origin falling edge signal instantaneous stop zero movement (if it sets the Z phase pulse, it starts to count Z phase signal after leaving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

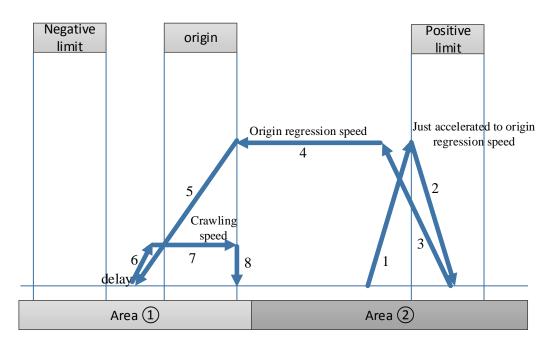
deceleration is completely still (frequency=0). Delay (direction delay time in SFD), low speed slow move in reverse direction with acceleration slope until reaching the origin regression speed, When leaving the origin falling edge signal instantaneous stop pulse outputting (if it sets the Z phase pulse, 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.



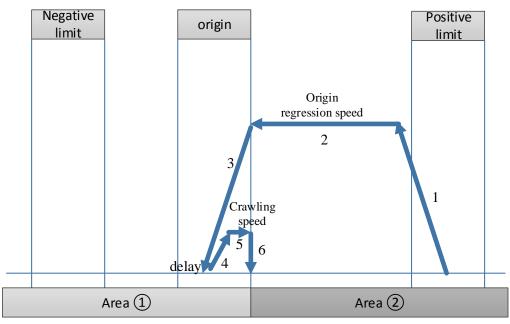
## **Conclusion:**

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.

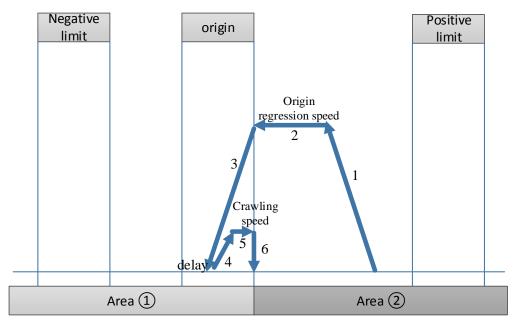
 $\approx$ 2: If the stopping position falls beyond the negative limit position, it may impact the machine. Please try your best to avoid such situation. This can be done by reducing the set deceleration slope or lengthening the length between the negative limit and the mechanical limit.

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

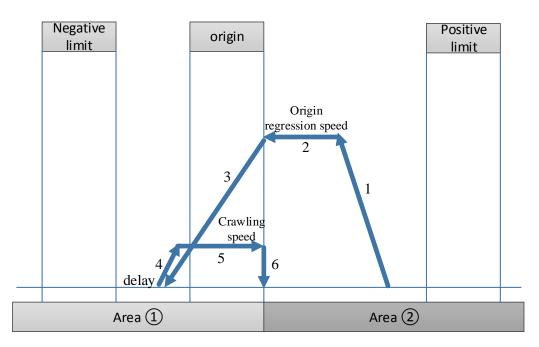
When the working table exceeds the positive limit, in order to prevent the occurrence of machine impact caused by positive return-to-origin, do not execute the return-to-origin. Please move the working table back to the negative( or positive) limit or between the positive limit and the negative limit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

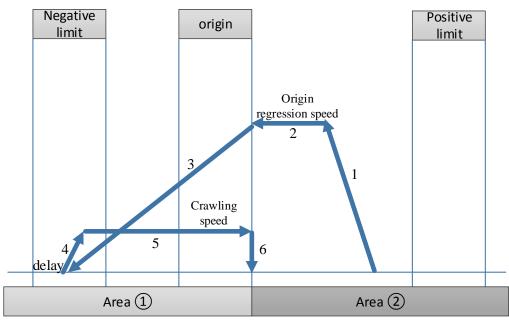
(5) When the table moves back toward the origin with the speed of mechanical return, it will start to slow down according to the set deceleration slope when it touches the rising edge of the mechanical origin. Due to the setting of different speed of mechanical return to the origin and deceleration slope,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



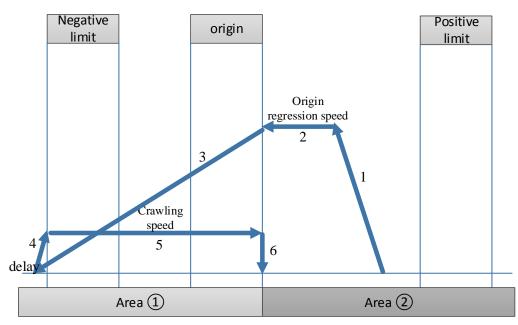
Stop position is on the mechanical origin



Stop position is between mechanical origin and negative limit



Stop position is on the negative limit



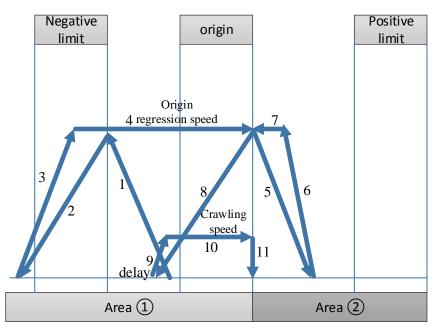
Stop position exceeded negative limit

## 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.

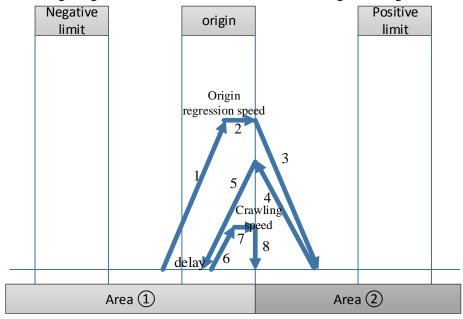
#### **Conclusion:**

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.

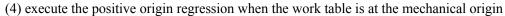
## **Conclusion:**

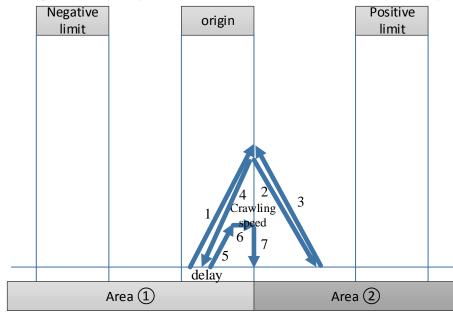
In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration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

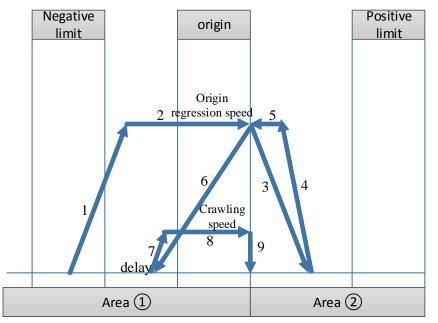
#### Note:

※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

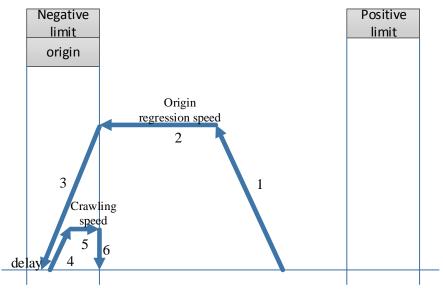
When the working table exceeds the negative limit, in order to prevent the occurrence of machine impact caused by reverse-returning to the origin, please do not go back to the origin. Please move the working table back to the negative or positive limit or between them by manual and then carry out the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

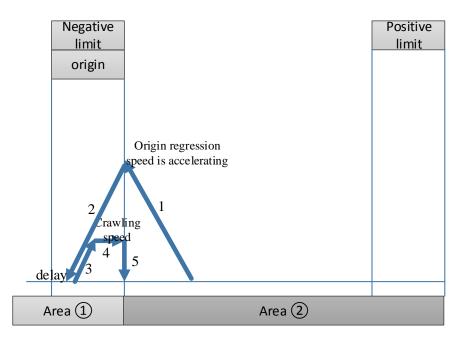
(2) When encountering the rising edge of the origin signal, slow down by the deceleration slope until complete rest (frequency =0).

(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:

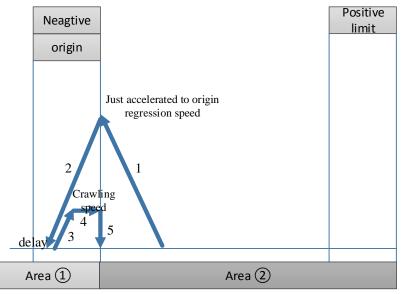
When the acceleration of the just started ZRN instruction has reached the rising edge of the mechanical origin signal, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); delay (the direction delay time in SFD), then reverse move at slow 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.



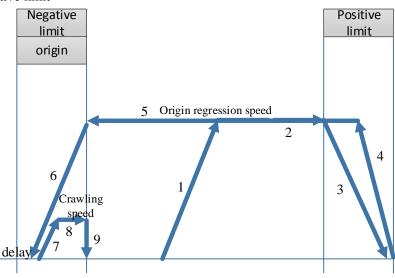
## **Conclusion:**

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).

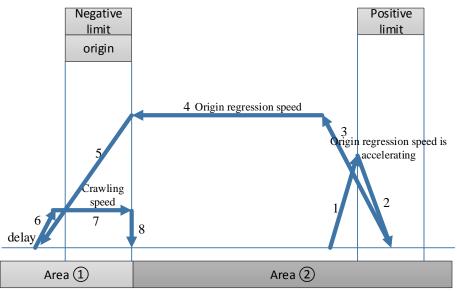
(5) delay (the direction delay time in SFD), then accelerated as the acceleration slope until reaching the crawling speed, then move forward, stop zero returning action at the moment of leaving the falling edge of origin signal (if it set Z phase pulse, it starts counting the Z phase after leaving the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

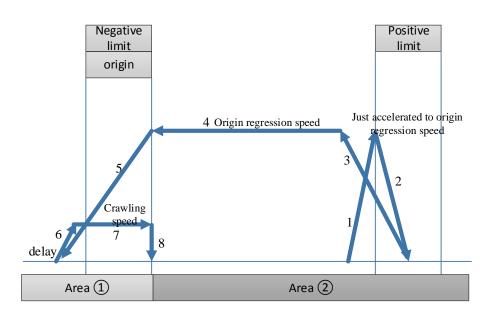
For the just started ZRN instruction, when it has already reached the rising edge of the positive limit signal in the process of accelerating towards positive limit, the deceleration slope is used as the deceleration action until the deceleration is completely still (frequency =0); immediately reverse 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.

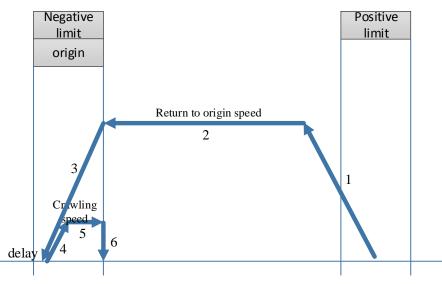
#### Note:

%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:**

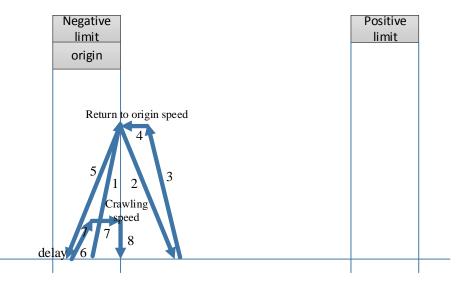
In the above cases, as long as the rising edge of the origin signal is touched (the right edge of the origin), whether the acceleration has reached the speed of returning to the mechanical origin, is in the process of acceleration, or just accelerated to the speed of returning to the origin, the deceleration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

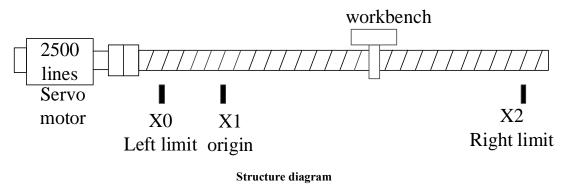
When the working table exceeds the negative limit, in order to prevent the occurrence of machine impact caused by positive return-to-origin, do not execute the return-to-origin. Please move the working table back to the negative(positive) limit or between the positive limit and the positive limit manually,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

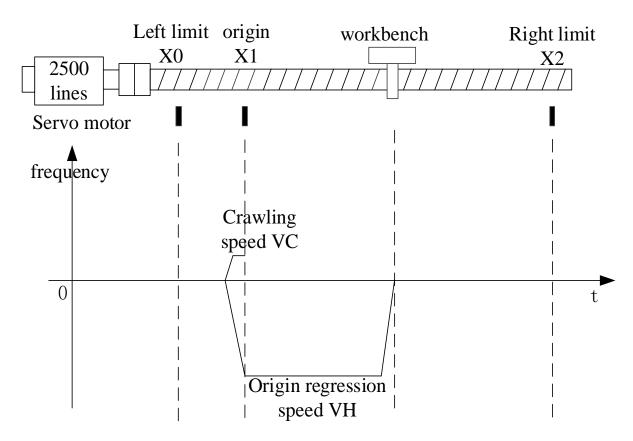
PLC1 - Pulse Set		X
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters 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	1
YO axis-Common-Gear clearance positive compensation	0	~
Read From PLC Write To PLC OK	Cancel	

Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD915 bit 8-bit 15	Value	
YO axis-Common-Gear clearance positive compensation	0	
YO axis-Common-Gear clearance negative compensation	0	в
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	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	
YO axis-Common-negative limit terminal setting	хо	١.

PLC1 - Pulse Set		X
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD936(dword)	Value	^
YO axis-Common-positive limit terminal setting	X2	
YO axis-Common-negative limit terminal setting	хо	
YO axis-Common-Zero clear CLR output setting	Y no terminal	١.,
YO axis-Common-Return speed VH	10000	
YO axis-Common-Creeping speed VC	100	17
YO axis-Common-Mechanical zero position	0	
YO axis-Common-Z phase num	0	
YO axis-Common-CLR signal delayed time (ms)	100	
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	<b>.</b>
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	0	
YO axis-group 1-Acceleration and deceleration time (ms)	150	Ш
YO axis-group 1-pulse acc/dec mode	linear acc/dec	L
YO axis-group 1-Max speed	200000	1
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 2-Pulse default speed	0	1

# > Mechanical origin regression motion diagram

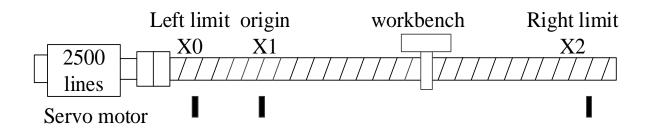


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- in the moment of leaving the falling edge of origin signal X1 with crawling speed, the mechanical origin regression end immediately.
- if origin regression speed, acceleration/deceleration time, and left limit origin position settings are unreasonable, 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 SED963	Value
YO axis-Common-Parameters setting-Pulse direction logic	
YO axis-Common-Parameters setting-enable soft limit	disable
VO 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

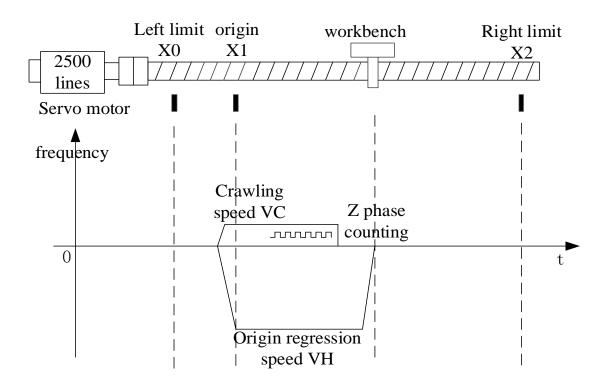
# PLC1 - Pulse Set

1201 1000 000		_
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	Х2	
YO axis-Common-negative limit terminal setting	хо	~
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	
YO axis-Common-Mechanical zero position	0	
YO axis-Common-Z phase num	6	
YO axis-Common-CLR signal delayed time (ms)	100	
YO axis-Common-grinding wheel radius(polar Interpola	0	1
YO axis-Common-soft limit positive value	0	
YO axis-Common-soft limit negative value	0	1
YO axis-Common-encoder pulse number/1 rotate(closed	1000	1

#### PLC1 - Pulse Set Config - Delete | init axis | config guide Param SFD927 ^ Value 1000 YO axis-group 1-Pulse default speed 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 200000 YO axis-group 1-Max speed 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 YO axis-group 2-Pulse default speed 0 ¥ Read From PLC Write To PLC OK Cancel

> Mechanical origin regression motion diagram



- 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 [STOP]					
16-bit	STOP	32-bit	-		
instruction		instruction			
Execution	Rising edge /falling edge of the	Suitable	XG1, XG2		
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

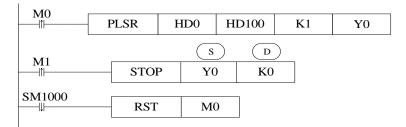
word	operand		System						constant	Mod	ule		
		$D^*$	FD	Т	D*	$CD^*$	DX	DY	DM*	$DS^*$	K/H	$\mathbb{D}$	QD
	D	•	•	•		•	•	•	•	•			
bit	Operand				Sys	stem			]				
		Х	Y	M*	<b>S</b> *	T*	C*	Dn.m					

*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**

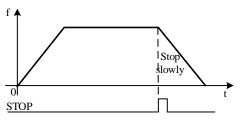
#### **Instruction format**



- 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,

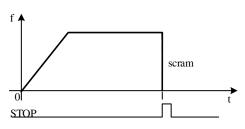
as the D parameter is K0, the pulse will stop slowly.

- Stop pulse includes PLSR, PLSF, DRVI, DRVA, ZRN. (PLSF cannot support GOON mode)
- 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	XG1, XG2			
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*	Dn.m
	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.

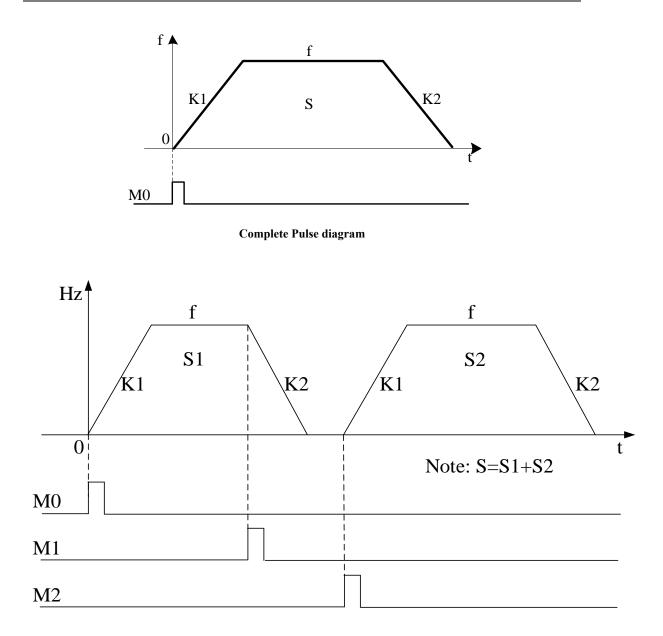
M means M, HM, SM; S means S, HS; T means T, HT; C means C, HC.

Function and action

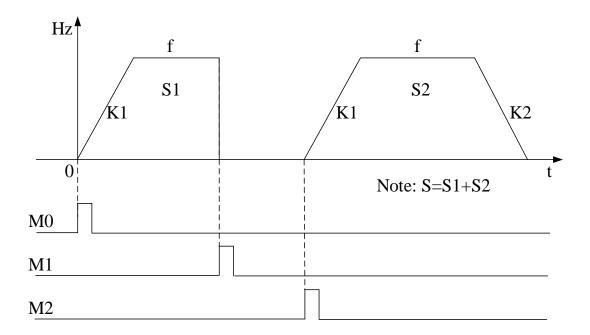
#### **Instruction format**

M0  ↑	PLSR	HD0	HD100	K1	Y0
M1	STOP	Y0	K0		
M2		S.			
	GOON	Y0			
SM1000		NO			
	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

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, v3.4.5 and above versions of software add a pulse parameter configuration wizard, which directly configures the pulse parameters of each pulse axis 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			
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)				
YO axis-Common-Offset (1)				
YO axis-Common-Pulse direction terminal Y no terminal				
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 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_FOLLOW parameters         K1_FOLLOW parameters         K2_Acceleration decele         K2_Pulse acceleration {         K2_Pulse accelera	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 configuration guide. Notes: the project tree is ticked when the parameters are configured an written in the PLC. Pulse parameters configuration is suitable for instruction PLSR, PLSF, ZRN.	٠d
	Prev Next OK Cancel	

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

#### The pulse parameter config guide describes:

	Pulse parameters configuration guide - Y0	×
Common parameter     Pulse direction     Pulse unit     Pulse unit     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 parameter     Second group parameters     K2_Acceleration decele     K2_Pulse acceleration (     K2_Clearance compens     K2_FOLLOW paramete     K2_FOLLOW paramete     K2_FOLLOW paramete     K2_FOLLOW paramete     K2_FOLLOW paramete     K2_Clearance compens     K2_FOLLOW paramete     K1_FOLLOW paramete     K2_FOLLOW paramete     FOLLOW paramete     K2_FOLLOW paramete     K2_FOLLOW paramete     K2_FOLLOW paramete     FOLLOW paramete     FOLL	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	

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.

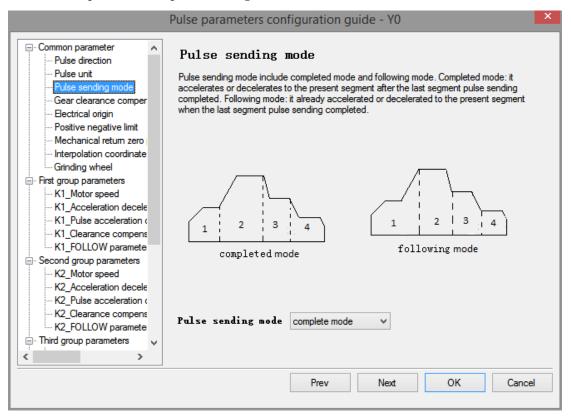
	Pulse parameters configuration guide - Y0
Common parameter  Pulse direction  Pulse unit  Pulse sending mode  Gear clearance comper  Electrical origin  Positive negative limit  Mechanical return zero	Pulse direction XD series PLC pulse output mode is pulse + direction (open collector). If the pulse direction 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.
Interpolation coordinate     Grinding wheel	Pulse direction 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 (relay) to output the pulse direction signal. Pulse direction terminal Y no termina Y
K1_FOLLOW paramete     Second group parameters     K2_Motor speed     K2_Acceleration decele     K2_Pulse acceleration (     K2_Clearance compens     K2_FOLLOW paramete	When sending positive direction pulse, set ON the pulse direction terminal firstly, the pulse will 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 time (ms).
Third group parameters	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 unit
Pulse sending mode Gear clearance comper Electrical origin Positive negative limit	Pulse parameters and system paramreters will change as the pulse unit. When pulse unit is pulse number, all the parameters are operated as pulse number; when pulse unit is equivalent, all the parameters are operated as equivalent.
Mechanical return zero     Interpolation coordinate     Grinding wheel     First group parameters	Pulse unit options
With the second se	Basic unit of equivation
Second group parameters	The pulse numbers of motor turning one circle
K2_Pulse acceleration (     K2_Clearance compens     K2_FOLLOW paramete     Third group parameters	Working table moving distance of motor turning one circle
< > >	
	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 decele K2_Acceleration decele K2_Pulse acceleration decele K3_Pulse acceleration decele K3	Gear clearance compensation         [gear clearance positive 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.         gear clearance positive compensation       0         gear clearance negative compensation       0         gear clearance negative compensation       0         Notes: this parameter will change as pulse unit. 0 means no compensation.
	Prev Next OK Cancel

# ★ Common parameters —electric origin

Pulse parameters configuration guide - Y0		
Common parameter     Pulse direction     Pulse unit	Electrical origin	
Welse sending mode     Gear clearance comper     Gear clearance comper     Positive negative limit	This function is not available.	
Mechanical retum zero     Micropolation coordinate     Grinding wheel     First group parameters		
With group parameters     With a second		
K2_Motor speed     K2_Acceleration decele     Wz_Pulse acceleration decele		
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 parameters     K1_FOLLOW 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	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 \vee	
Positive negative limit	3. origin signal terminal	X no termin; 🗸	
Mechanical return zero Interpolation coordinate	4. Returning speed VH	1000	
Grinding wheel	5. crewling 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 \vee	
K1_FOLLOW paramete ⊡- Second group parameters	8.Z phase signal terminal	X no termin; \vee	
K2_Motor speed K2_Acceleration decele	9.Z phase pulse numbers	0	
	10.CLR signal delay time	20	
K2_Clearance compens K2_FOLLOW paramete	11.CLR signal terminal	Yno termin; \vee	
Third group parameters	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 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 K2_Clearance compens K2_FOLLOW parameters K2_FOLLO	
Prev Next OK Cancel	

# ★ 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 parameters	<b>First group of parameter</b> — <b>motor speed</b> [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. [start 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.
<ul> <li>First group parameters</li> <li>K1_Motor speed</li> <li>K1_Acceleration decele</li> <li>K1_Pulse acceleration of</li> <li>K1_Clearance compens</li> <li>K1_FOLLOW parameters</li> <li>K2_Motor speed</li> <li>K2_Acceleration decele</li> <li>K2_Pulse acceleration of</li> <li>K2_Clearance compens</li> </ul>	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

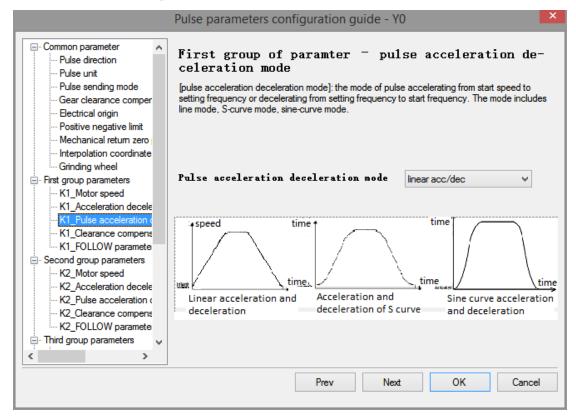
#### ★ First group parameters —Acceleration and deceleration slope

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

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

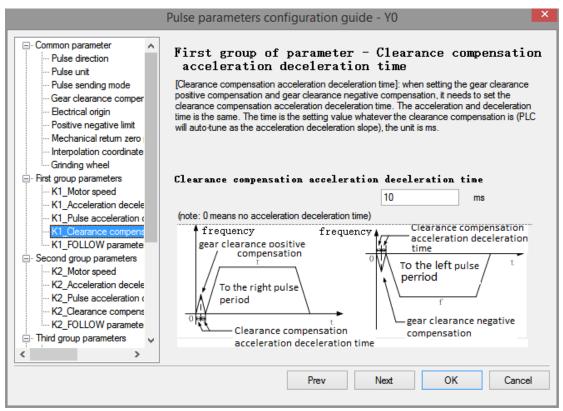
#### ★ First group parameters —Pulse acceleration and deceleration mode

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.



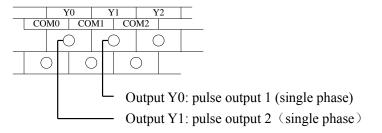
#### ★ First group parameters —FOLLOW parameter

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

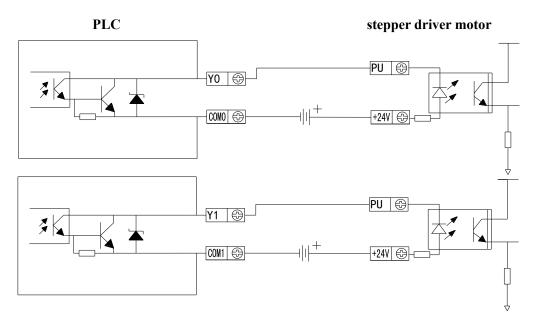
Pulse parameters configuration guide - Y0		
Common parameter     Pulse direction     Pulse unit	First group of parameter - FOLLOW	
Pulse anii     Pulse sending mode     Gear clearance comper     Positive negative limit     Mechanical retum zero     Interpolation coordinate     Grinding wheel     First group parameters	FOLLOW function: PLC measures the pulse input feedbacking from encoder or pulse 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 (little delay time). FOLLOW feedforward compensation: there is delay from receiving pulse to outputting pulse. 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 (range 1~100, default value is 50)	
K2_Motor speed     K2_Acceleration decele     K2_Pulse acceleration (	FOLLOW feedforward parameter 0	
<ul> <li>K2_Clearance compens</li> <li>K2_FOLLOW paramete</li> <li>Third group parameters</li> </ul>	(range 0~100, default value is 0, it no need to set for general condition) 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.

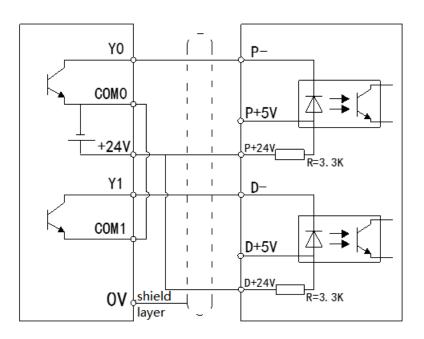
# 1-4. Output wiring and notes



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



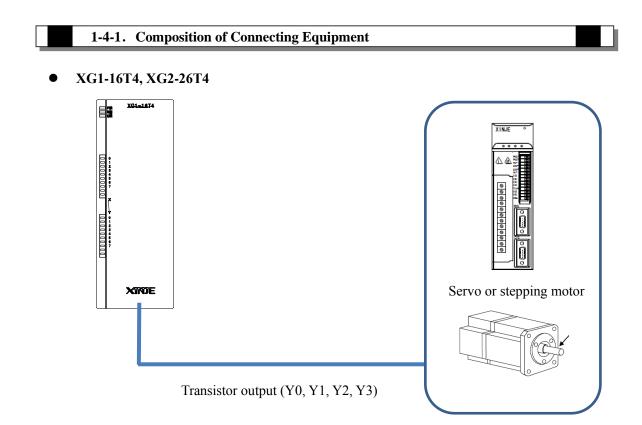
Note: If the pulse and direction terminals of stepper motor are driven by DC5V, please connect 2.2K resistance behind the pulse output terminal and direction output terminal.



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 XG series PLC hardware user manual.



it can control 4-axis servo motor or stepping motor. ★

#### 1-4-2. Pulse output performance specification

Pulse output performance specification:

Parameter	XG1-16T4	XG2-26T4	
Axis number	2	1	
Interpolation	S	nort	
function	Sup	port	
Output mode	Open c	ollector	
Output form	Pulse + o	direction	
Max frequency	100KHz		
Acceleration and	Linear acceleration and deceleration + S curve acceleration and		
deceleration	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		
treatment	deceleration + sine curve acceleration and deceleration		
Control unit	Pulse, 1mm, 0.1mm, 0.01mm, 1um		
Positioning range	-2147483648~2147483647 (pulse)		
Programming	I adden dia anom		
language	Ladder diagram		
Manual pulse	Support		
connection			

#### Note:

(1) All XG 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  $500 \Omega$  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 <<<<<

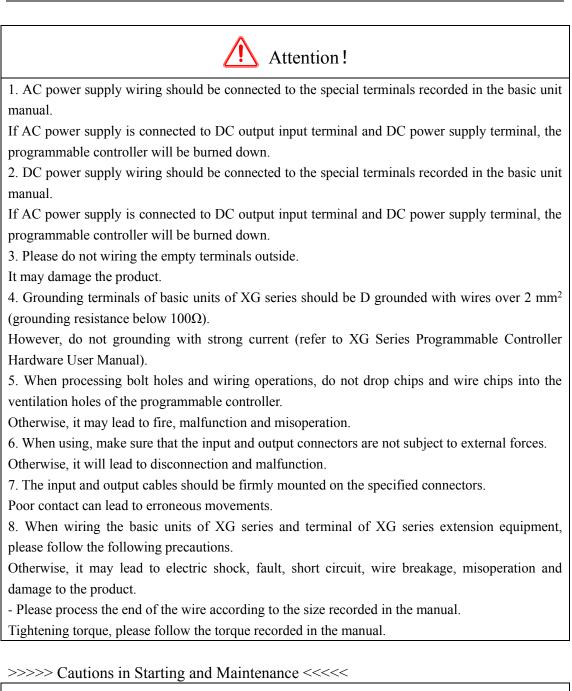


1. When installing, wiring and other operations, be sure to disconnect all external power supply before operation.

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.





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.

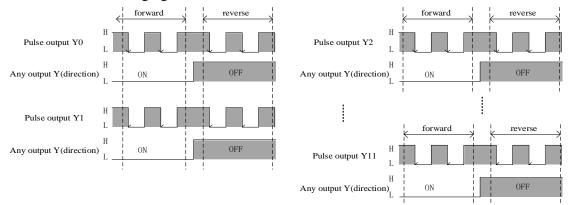
--Peripheral devices, extended function boards, special adapters,

--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 XG 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)

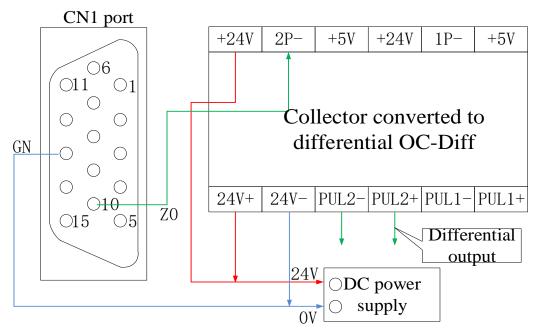
As shown in the table below, please make the input form of the pulse in the parameters of servo amplifier (driving unit) coincide with the output form of the programmable controller.

	Pulse output form of basic unit	Collector convert to
servo amplifier		differential DC-Diff
(driving unit)	Transistor output (Leakage output)	Differential drive
	Pulse + direction	Forward and reverse pulses
Instruction pulse	Pulse + sign	Forward and reverse pulses

input form		
Instruction pulse	Negative logic	Negative logic
logic		

Note: The main pulse output form of XG 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> <u>signal by DC-Diff (taking DS2-21P5-A as an example):</u>



#### 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)

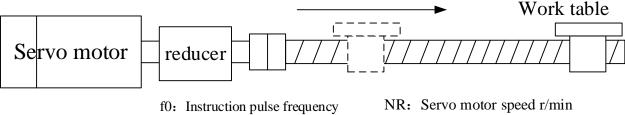
By using the electronic gear of the servo motor, the movement of each pulse can be set. For the setting of electronic gears, please refer to the manual of servo driver, set values that are consistent with the use.

# **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



CMX: Electronic gear/numerator CDV: Electronic gear/denominator

X: 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:

$$NR = \frac{CMX}{CDV} \times \frac{60}{Pt} \times f0$$
$$= \frac{50}{1} \times \frac{60}{10000} \times 200000$$
$$= 6000 \text{ r/min} > 3000 \text{ r/min} \text{ (Rated speed)}$$

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.

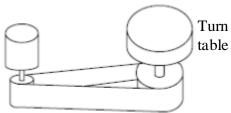
#### Example 2

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]



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[°]

Synchronous belt: 1:5

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

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

As can be seen from the figure above, the ratio of electronic gear of servo driver should be set to 25:18.

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

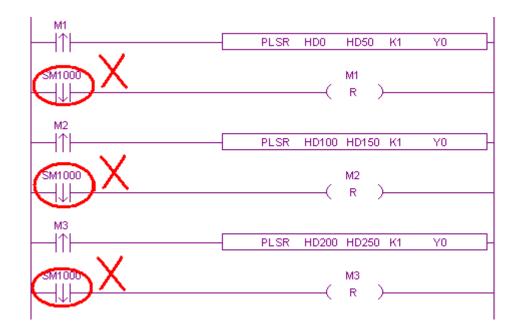
When the pulse sending flag SM1000, SM1020, SM1040 are changed from ON to OFF, it means that the action of instruction (pulse output action, etc.) is over. However, it does not mean that the action of the servo motor is over. In order to accurately grasp the end of the servo motor's operation, please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

Pulse sending flag:

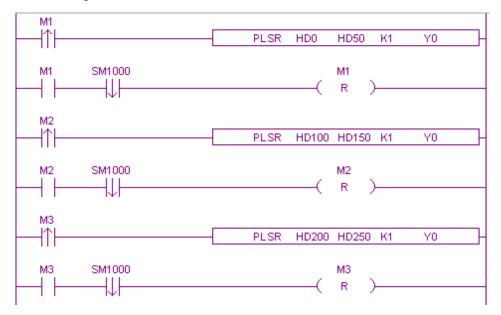
Flag	Axis	Explanation
SM1000	PULSE_1	When the pulse is sending, the coil is ON, and the OFF is set immediately after the pulse is sent. The falling edge of the coil is used to
SM1020	PULSE_2	judge whether the pulse is sent or not.
SM1040	PULSE_3	Pulse segment
SM1060	PULSE_4	SM1000

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

XG 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

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

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	×	$\times$	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 pulse direction	May not set	May not set	×	×	May not set
Common parameter —gear clearance positive compensation	May not set	May not set	×	×	May not set
Common parameter —gear clearance negative compensation	May not set	May not set	×	×	May not set
Common parameter —electric origin position	×	×	×	×	×
Common parameter —origin switch state setting	×	×	×	×	Must set
Common parameter — origin signal terminal setting	×	×	×	×	Must set
Common parameter —Z phase switch state setting	×	×	×	×	May not set

Common parameter — Z phase terminal setting	×	×	×	×	May not set
Common parameter —positive limit	May not	May not			Must set
switch status setting	set	set	×	×	widst set
Common parameter —positive limit	May not	May not			Must set
terminal setting	set	set	×	×	Widst set
Common parameter —negative limit	May not	May not			Must set
switch status setting	set	set	×	$\times$	Widst set
Common parameter —negative limit	May not	May not			Must set
terminal setting	set	set	$\times$	$\times$	Winst set
Common parameter —zero clear CLR					May not
signal output terminal setting	×	×	×	×	set
Common parameter — return speed					Must set
VL	×	×	×	×	1.1.1.00 000
Common parameter —creeping speed					Must set
VC	×	×	×	×	
Common parameter — mechanical					Must set
zero position	×	×	×	×	
Common parameter — Z phase					May not
number	×	×	×	×	set
Common parameter — CLR signal					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		~	Must set
speed			X	×	
Group 1 parameter — acceleration	Must set	Must set			Must set
time of pulse default speed			X	×	
Group 1 parameter — deceleration	Must set	Must set	Ň	~	Must set
time of pulse default speed			×	×	
Group 1 parameter — Interval	May not	May not	$\sim$	$\sim$	May not
acceleration and deceleration time	set	set	×	×	set
Group 1 parameter — pulse acc/dec	Must set	Must set	$\sim$	$\checkmark$	Must set
mode			×	×	
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:

 $\approx$ 1: group 0, 2, 3, 4 parameters are same to group 1.

 $\approx$ 2: When "the first set of parameters - regression speed VH" and "the first set of parameters - crawling speed VC" are set, VH and VC of common parameters may not be set.

#### 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.

No.	Function	Notes	Axis	
HSD0	Low 16-bit of cumulative pulse	Dulas number is the unit		
HSD1	High 16-bit of cumulative pulse	Puise number is the unit	DILL SE 1	
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	Dulas number is the unit		
HSD5	High 16-bit of cumulative pulse	Puise number is the unit	DILLSE 2	
HSD6	Low 16-bit of cumulative pulse	Pulse equivalent is the	PULSE_2	
HSD7	High 16-bit of cumulative pulse	unit		
HSD8	Low 16-bit of cumulative pulse	Dulco 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	Dulas number is the unit		
HSD13	High 16-bit of cumulative pulse	ruise number is the unit		
HSD14	Low 16-bit of cumulative pulse	Pulse equivalent is the	PULSE_4	
HSD15	High 16-bit of cumulative pulse	unit		

The cumulative registers for each pulse output are shown in the following table:

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 ON; when the pulse value is negative, the coil is OFF.
2	SM1021	PULSE_2	frequency
3	SM1041	PULSE_3	Pulse segment
4	SM1061	PULSE_4	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

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

Action	Instruction	Program example		
Action		Sequential ladder chart	Process ladder chart	
Multi section pulse	PLSR	1-5-4	1-5-5	
positioning	PLSK	1-5-6	1-5-7	
Variable frequency	PLSF	1-5-2	1-5-3	
pulse output	PLSF	Sequential ladder chartProcess ladder chart1-5-41-5-51-5-61-5-7	1-5-5	
Relative single section	DRVI	1-5-2	1-5-3	
positioning	DKVI	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	

#### 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.

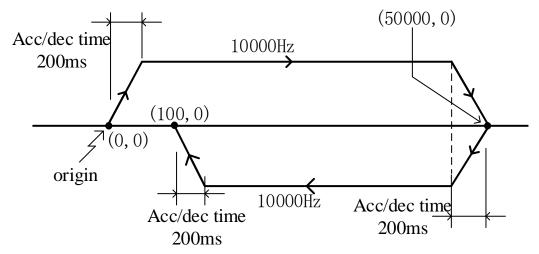
Signal name	I/O points	Notes
Pulse output port	Y0	
Pulse direction port	Y2	
CLR zero clear signal	Y3	
Servo ready	X0	
Stop	X1	
Pulse continue	X10003	
Origin regression	X4	

Jog forward	X5	
Jog reverse	X6	
Forward rotation positioning	X7	
Reverse rotation positioning	X10000	
Origin input terminal	X3	External interruption terminal
Forward limit switch	X10001	
Reverse limit switch	X10002	

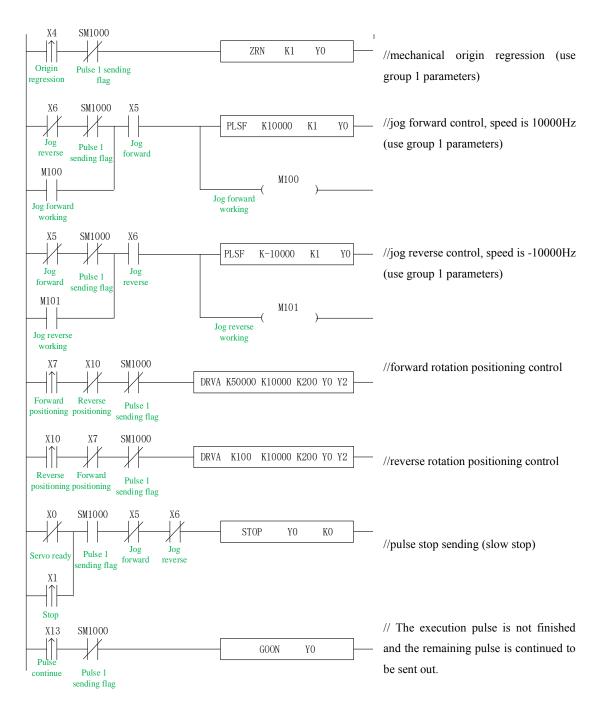
Note: the input points of XG body PLC are not enough, so it is necessary to borrow the input points on the expansion module, and the input points of 1# module start from X10000.

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

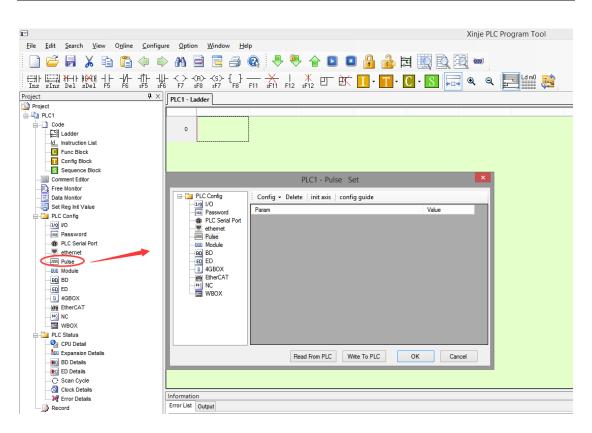
Example 1: According to the following figure, use the absolute single section positioning method.



Firstly, the ladder chart program is shown as follows:



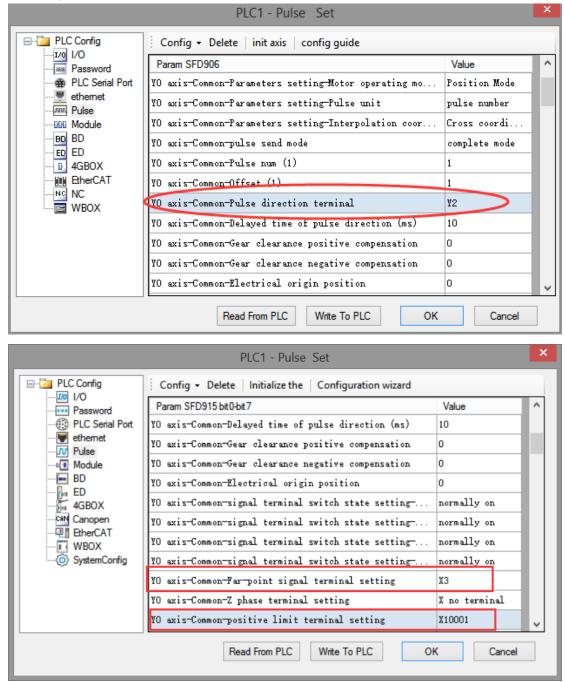
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So we click the "pulse configuration parameters" in the PLC programming software, as follows:

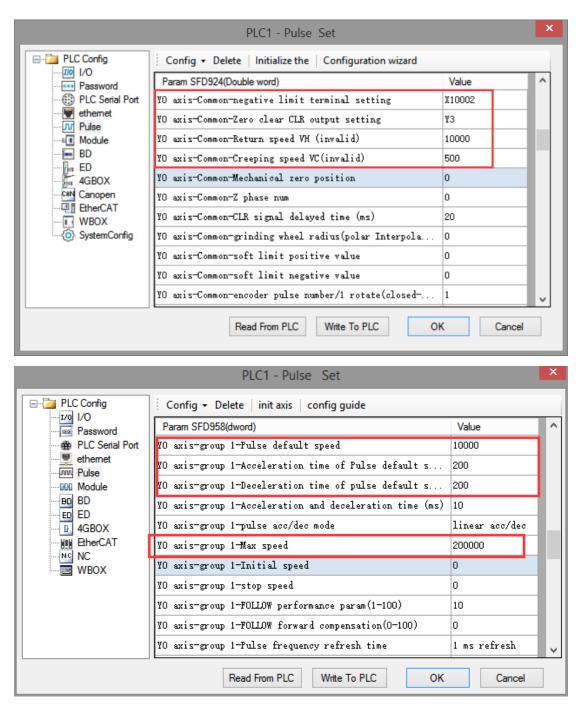


Click config, then select Y0 axis.

	PLC	C1 - Pulse Set		×
PLC Config	Config - Delete 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			
	Y7 axis			
IIIII B WBOX	Y10 axis			
	Y11 axis			
		J		
	Read Fr	rom PLC Write To PLC	OK Cancel	

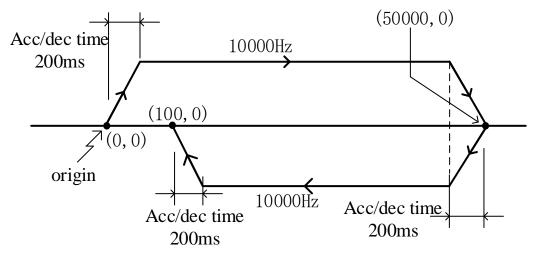
In the parameter configuration table, configure as follows (circled parameters need to be modified):



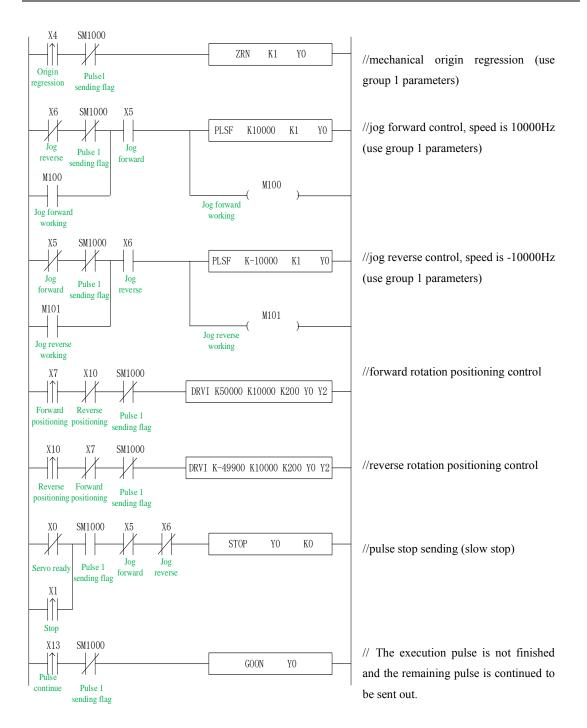


After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.



Example 2: According to the following figure, use the relative single segment positioning method.



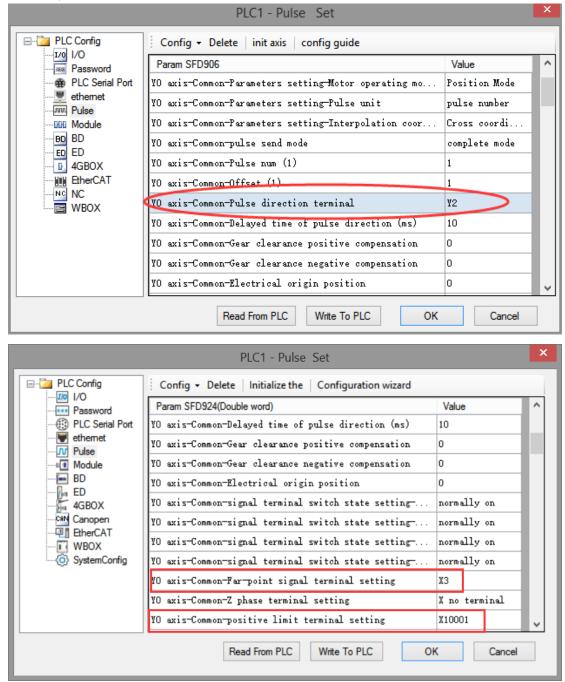
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

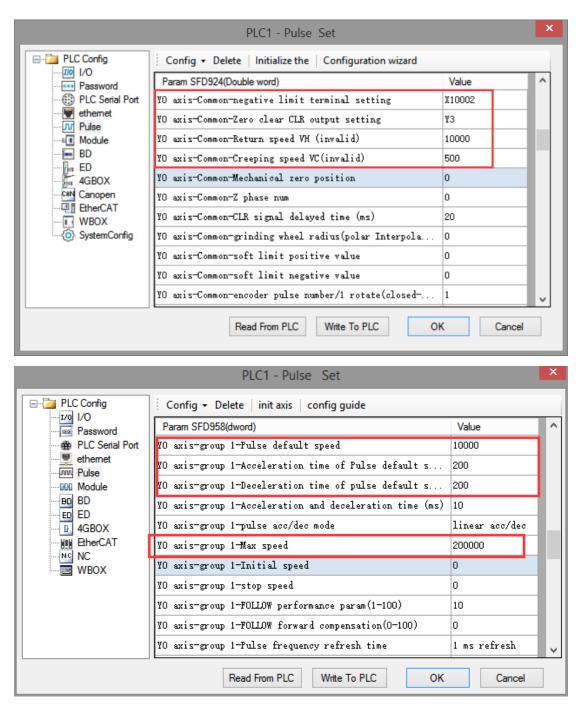
Ē	Xinje PLC Program Tool
<u>File Edit Search View Online Configure</u>	<u>Option Window H</u> elp
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TINS SINS Del SDel F5 F6 sF5 sF6	<pre> <pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre>
Project 4 X	PLC1 - Ladder
Project	
Code     Ladder     Ladder     Ladder     Ladder     Ladder     Sunc Block     Confg Block     Souence Block	0
Comment Editor	PLC1 - Pulse Set X
- R Free Monitor	
Data Monitor	PLC Config Config Config Delete   init axis   config guide
	Param Value
PLC Config	- the reserved of the reserved
	- ethemet
Password	- Form Pulse
PLC Serial Port	
ethernet	- ee BD - ee ED
Pulse Pulse	
BD BD	- With EtherCAT
	-NC NC
	WBOX
- HIN EtherCAT	
NC NC	
B WBOX	
PLC Status	
Q CPU Detail	
Expansion Details	
BD Details	Read From PLC Write To PLC OK Cancel
ED Details	
CITOI 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	

216



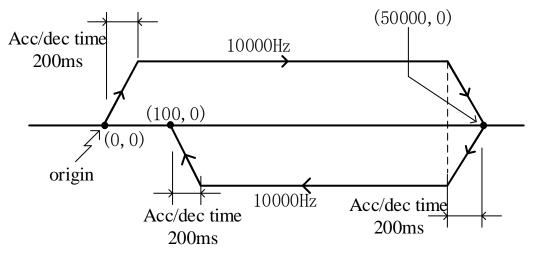


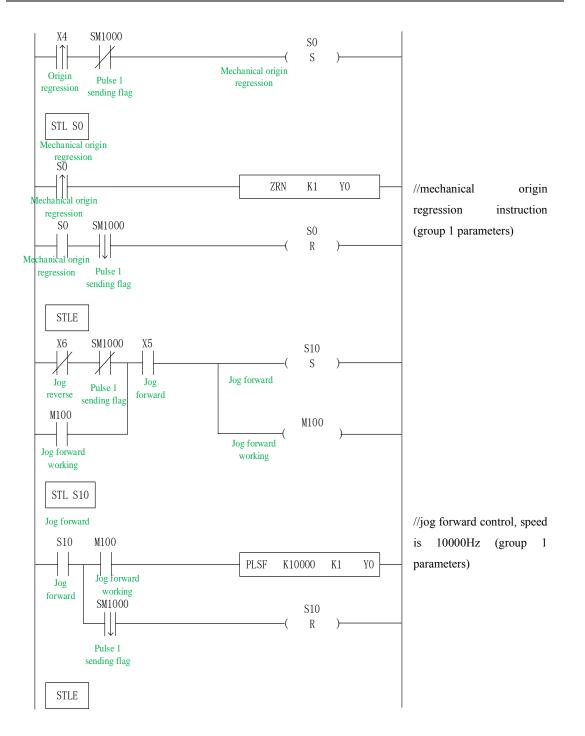
After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

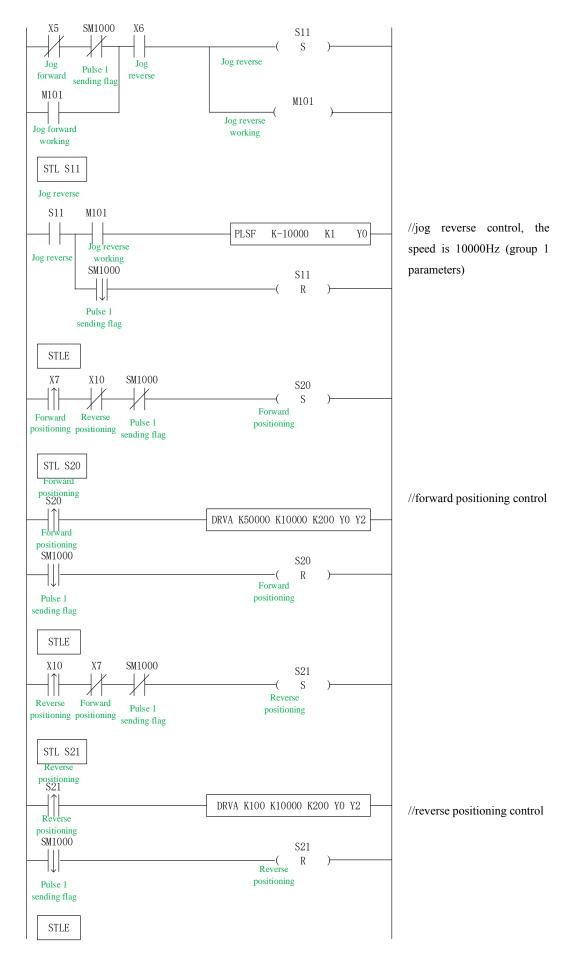
Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

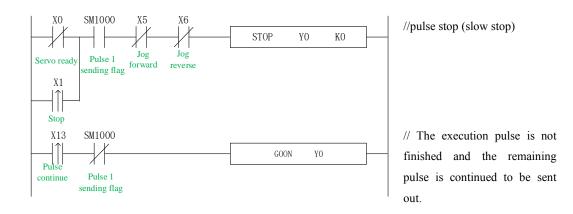
## 1-5-3. Forward and reverse rotation process program **[**PLSF, DRVI, DRVA, ZRN**]**

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

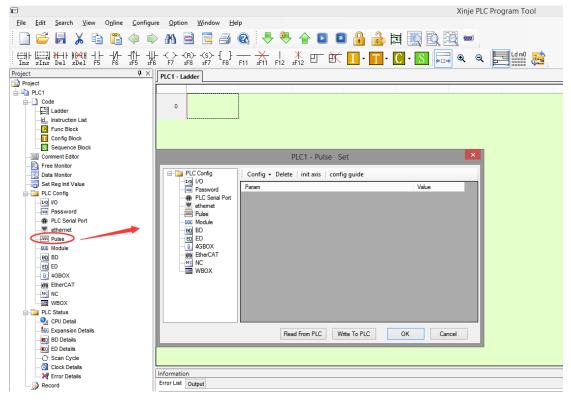








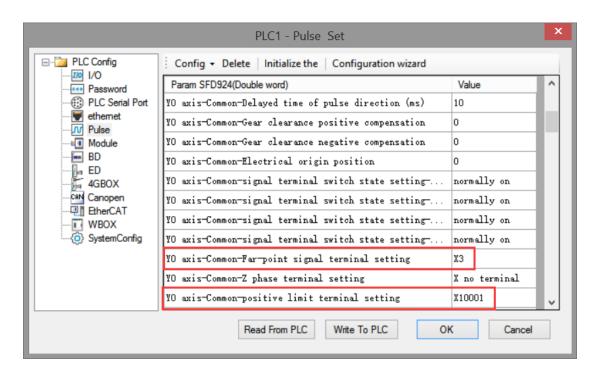
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

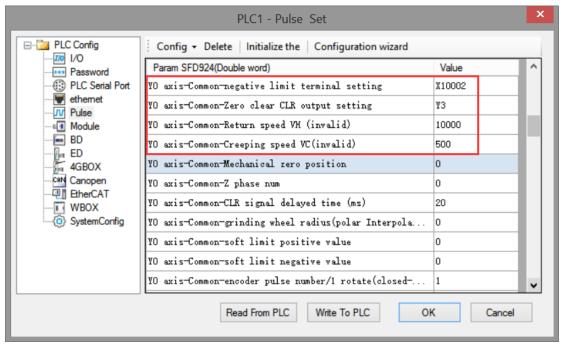


Click config, then select Y0 axis.

	PLC1 - Pulse Set	×
PLC Corfig	Config • Delete     init axis     config guide       V0 axis     Value       V1 axis     Y2 axis       Y2 axis     Y3 axis       Y4 axis     Y5 axis       Y6 axis     Y6 axis       Y7 axis     Y10 axis       Y11 axis     Y11 axis	
	Read From 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	<b>_</b>
	Read From PLC Write To PLC OK	Cancel	

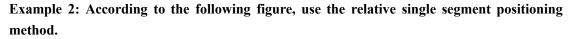


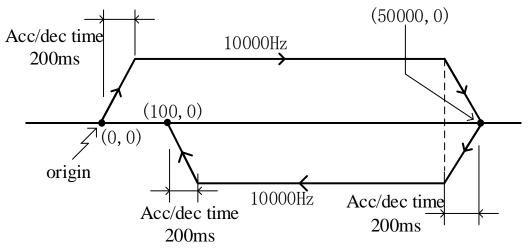


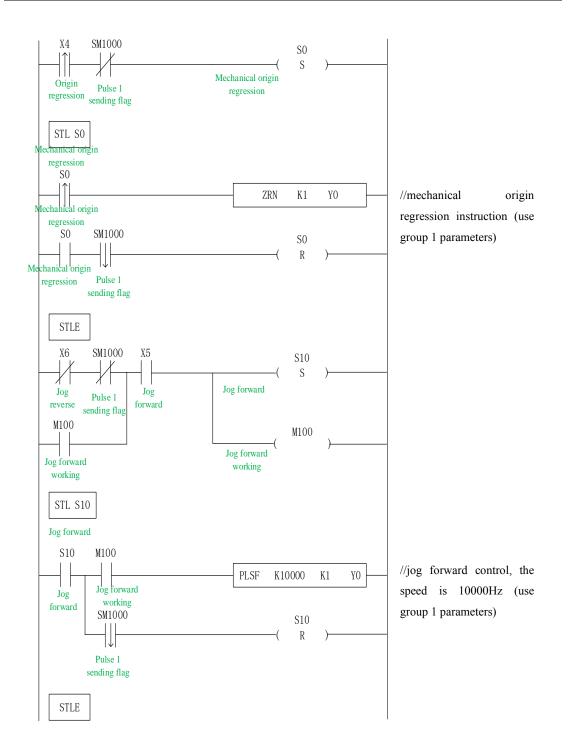
	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete 🛛 init axis 🔷 config guide		
Password	Param SFD958(dword)	Value	^
PLC Serial Port	10 axis-group 1-Pulse default speed	10000	
ethemet	YO axis-group 1-Acceleration time of Pulse default s	200	
	10 axis-group 1-Deceleration time of pulse default s	200	
BD BD	YO axis-group 1-Acceleration and deceleration time (ms)	10	
B 4GBOX	YO axis-group 1-pulse acc/dec mode	linear acc/dec	
EtherCAT	YO axis-group 1-Max speed	200000	
WBOX	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	

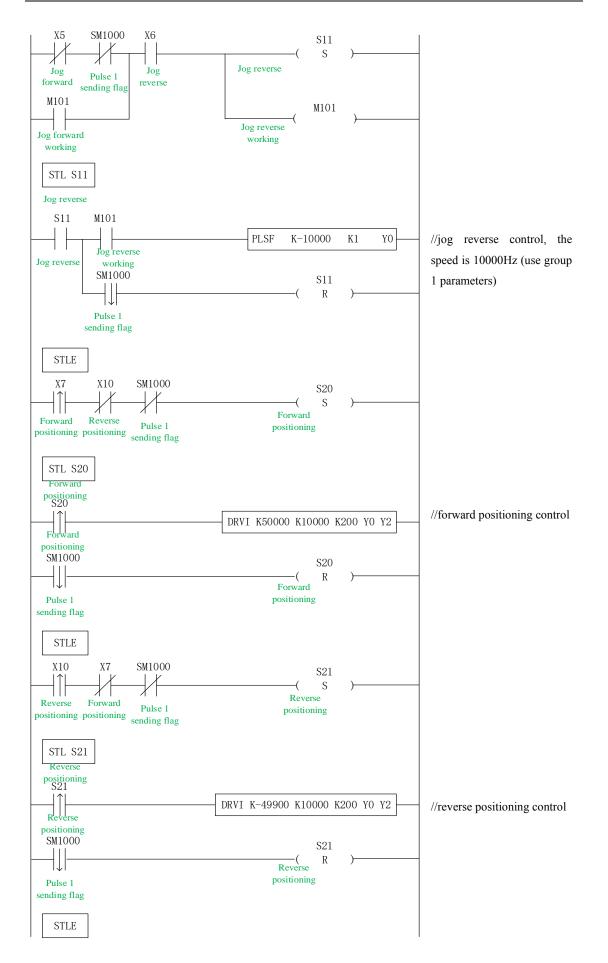
After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

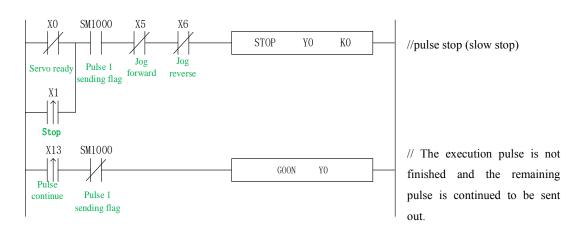
Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.











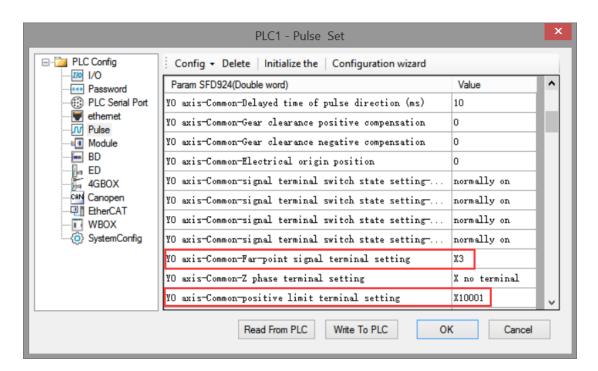
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

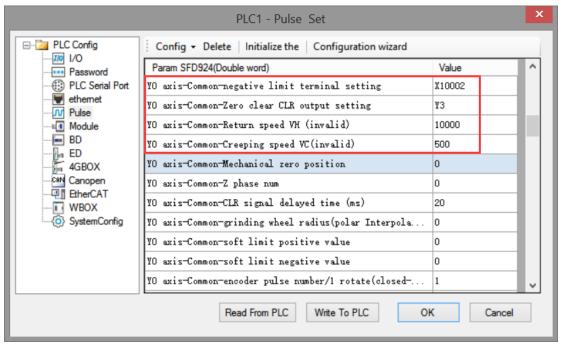
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Ins sIns Del sDel F5 F6 sF5 sF	┟╴<冫-‹ᠻݤ-‹{\$}ݤ-{{}} — ┼ │ # H IF12 "F12 Ư 跶 🚺 • ∏ • 🖸 • 🔂 🤜 🔍 🍳 🗮 🕍 🗰
Project 📮 🗙	PLC1 - Ladder
Project	
E-PLC1	
ia	0
d Instruction List	
Func Block     Config Block	
Sequence Block	
Comment Editor	PLC1 - Pulse Set
Free Monitor	
	Config Config Delete init axis config guide      Init axis config guide
Set Reg Init Value	Param Value
PLC Config	- 🏘 PLC Serial Port
Password	
PLC Serial Port	- Finite Pulse
ethernet	
Pulse	
	-D 4GBOX
BD BD	- WE BhecAT
ED ED	
D 4GBOX	
EtherCAT	
NC NC	
WBOX	
E DLC Status	
CPU Detail	
BD Details	Read From PLC Write To PLC OK Cancel
ED Details	
C Scan Cycle	
Clock Details	
K Error Details	Information
Record	Error List Output

Click config, then select Y0 axis.

	PLC1 - Pulse Set	×
PLC Corfig	Config • Delete     init axis     config guide       V0 axis     Value       V1 axis     Y2 axis       Y2 axis     Y3 axis       Y4 axis     Y5 axis       Y6 axis     Y6 axis       Y7 axis     Y10 axis       Y11 axis     Y11 axis	
	Read From 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	<b>_</b>
	Read From PLC Write To PLC OK	Cancel	

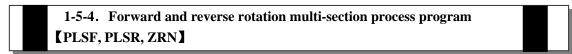




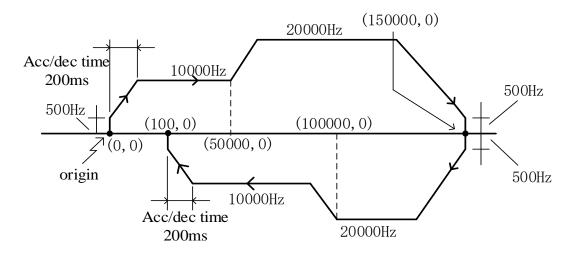
	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete 🛛 init axis 🔷 config guide		
Password	Param SFD958(dword)	Value	^
PLC Serial Port	10 axis-group 1-Pulse default speed	10000	11
ethemet	YO axis-group 1-Acceleration time of Pulse default s	200	
	VO axis-group 1-Deceleration time of pulse default s	200	
BD BD	YO axis-group 1-Acceleration and deceleration time (ms)	10	
B. 4GBOX	YO axis-group 1-pulse acc/dec mode	linear acc/dec	11
EtherCAT	YO axis-group 1-Max speed	200000	
WBOX	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	]

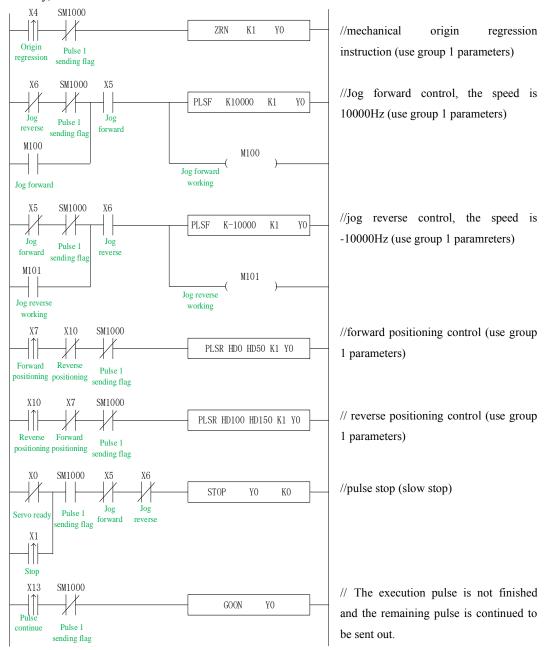
After configuring the parameters, click the "Write to PLC" button to write the parameters into the PLC. After downloading the program, power off the PLC and then power on again.

Positive Limit (X10001) and Negative Limit (X10002) 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.



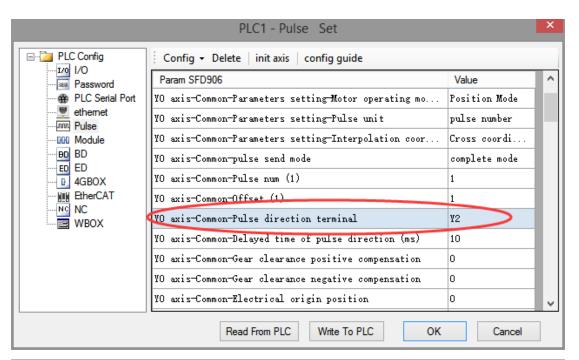


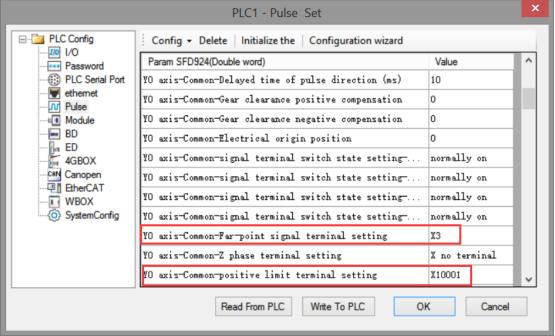
In the sample program, except DRVI and DRVA, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

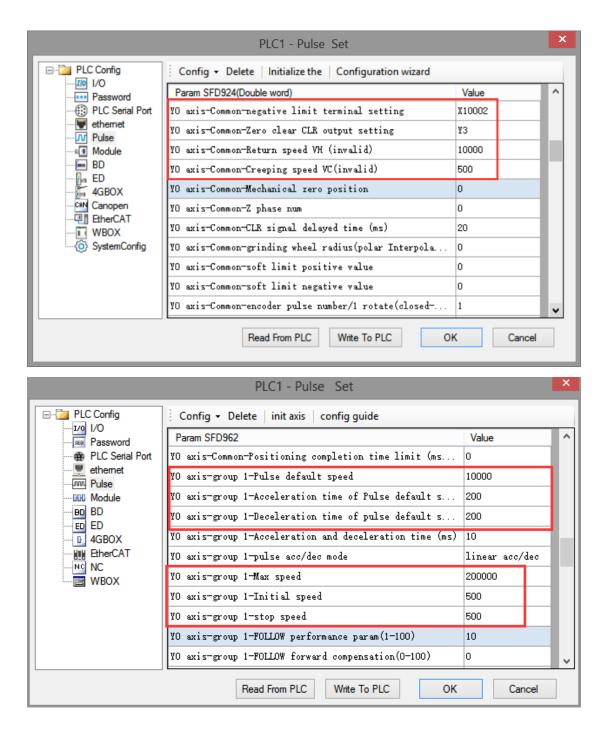
<b>F</b>	Xinje PLC Program Tool
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Project # X	PLC1 - Ladder
Project	rtt - Lader
- PLC1	
☐ Code	0
Comment Editor	PLC1 - Pulse Set
Free Monitor	
Data Monitor	PLC Config → Delete   init axis   config guide
Set Reg Init Value	Param Value
E-D PLC Config	Param Value
I/0 VO	ethemet
Password	- Inn Pulse
PLC Serial Port	
Pulse	
DOD Module	- Kin EtherCAT
BD BD	
ED ED 4GBOX	WBOX
WIN EtherCAT	
WBOX	
PLC Status	
CPU Detail	
BD Details	Read From PLC Write To PLC OK Cancel
ED Details	
C Scan Cycle	
Clock Details	
K Error Details	Information
- Decord	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			
GBOX	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Cance	el







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":

F	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 "absolute" (default is "relative"), as shown in the following figure:

multi section pulse output											
data start address: HI	)0 user p	arams address:	HD50	system params:	K1	output:	YO				
mode: absolut v start execute section count: 0 Config											
Add Delete Upw	ards Downwa	rds									
fre	frequence pulse count			wait condition wait registe				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:

node:	absolut ∨ start	execute section count:	0 Config		
Add Del	ete Upwards Downw	ards			
	fr equence	pulse count	wait condition	wait register	iumn register
1 10000		50000	pulse sending complete	KO	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	
	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
Ж	Cut	
è	Сору	
b	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:

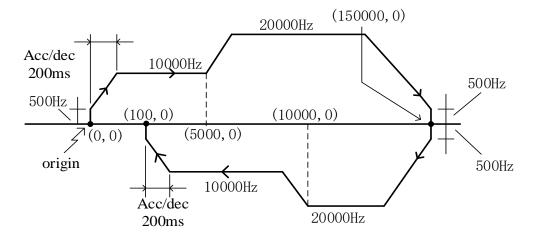
data start ad		arams address:	HD150 system params: K1	output: Y0	
node: Add Del	ete   Upwards Downwa	xecute section count: rds	0 Config		
	frequence	pulse count	wait condition	wait register	jump register
1	20000	100000	pulse sending complete	KO	KO
▶ 2	10000	100	pulse sending complete	KO	KO

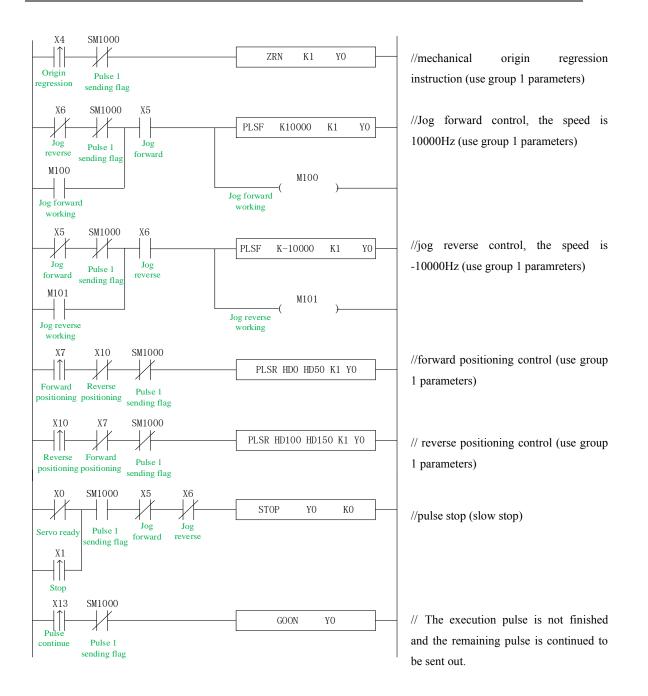
Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address 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 (X10001) and Negative Limit (X10002) 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.



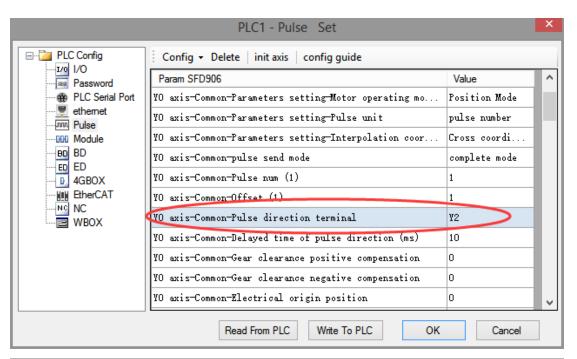


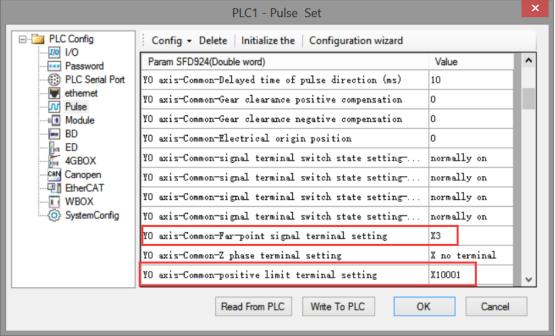
In the sample program, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

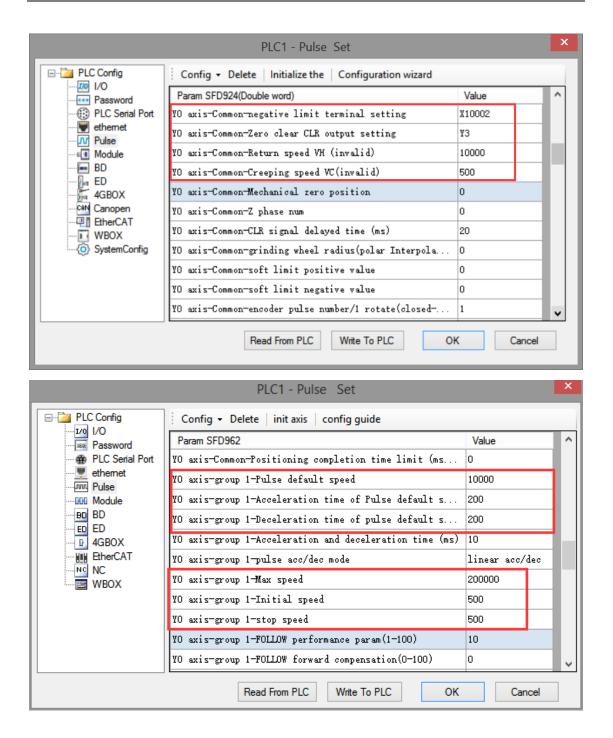
<b>F</b>	Xinje PLC Program Tool
<u>File Edit Search View Online Configu</u>	re <u>Option Window H</u> elp
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Project # X	PLC1 - Ladder
Project	rtt - Lader
E-PLC1	
☐ Code	0
Comment Editor	PLC1 - Pulse Set
Free Monitor	
Data Monitor	PLC Config → Delete   init axis   config guide
Set Reg Init Value	Param Value
E-D PLC Config	Param Value
I/0 VO	ethemet
Password	- Inn Pulse
PLC Serial Port	
Pulse	
DOD Module	- Kin EtherCAT
BD BD	
ED ED 4GBOX	WBOX
WIN EtherCAT	
WBOX	
PLC Status	
CPU Detail	
BD Details	Read From PLC Write To PLC OK Cancel
ED Details	
C Scan Cycle	
Clock Details	
K Error Details	Information
- Decord	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			
Pulse 	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	el







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":

	LSR HD0 HD50 K1 Y0	
<	PLSR Instruction Parameter Data Config	<u> </u>
	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 se	ction pu	Ilse output				×
Г									
L	data start address:	HD0	user params address:	HD50	system params:	K1	output:	Y0	
	mode:	relative 🗸	start execute section count:	0	Config				
L	Add Delete U	Upwards D	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:

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	
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 "relative" (default is "relative"), as shown in the following figure:

			multi se	ction pu	lse output				×
L	data start address:	HD100	user params address:	HD150	system params:	K1	output:	YO	
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:

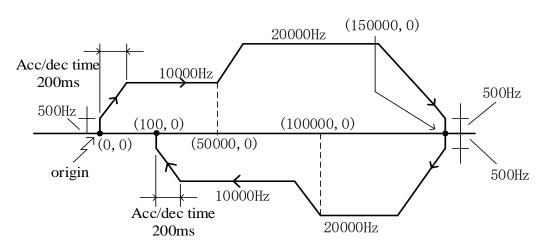
data start address: HD100 user pa		rams address:	HD150 system params:	K1	output:	YO	
mode:	relative ❤ start ex	ecute section count:	0 Config				
Add De	elete Upwards Downward	ds					
	fraguarda	pulso count	moit condition		wait register		jump register
1	20000	-50000	pulse sending complete		KO		KO
2	10000	-99900	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.

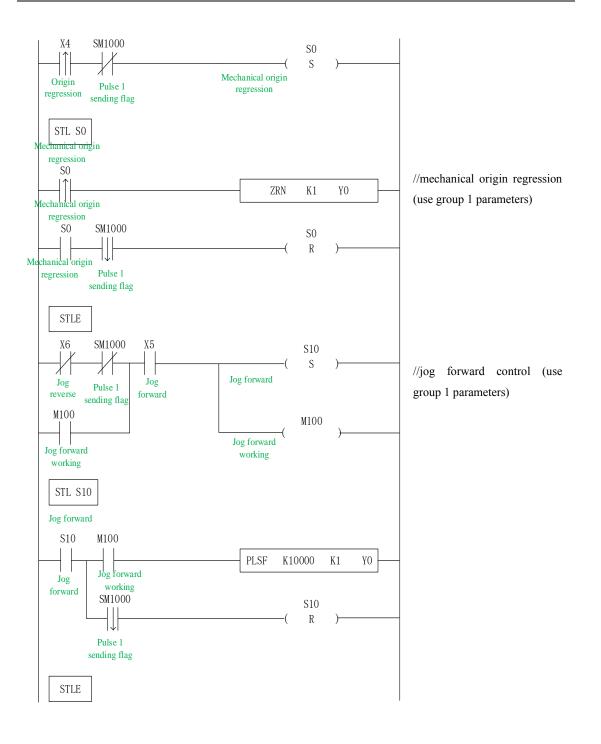
After downloading the program, power off the PLC and then re-energize it.

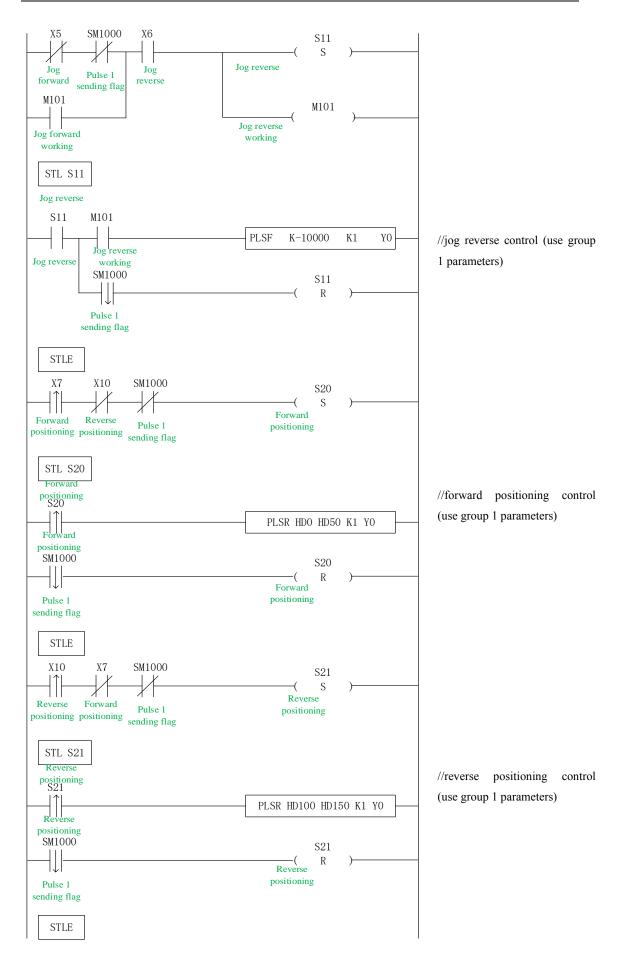
Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

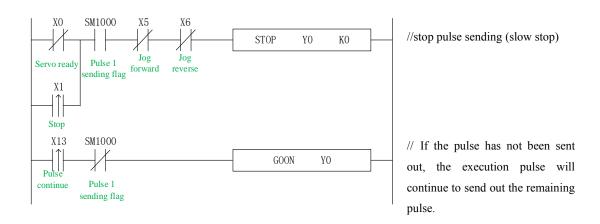




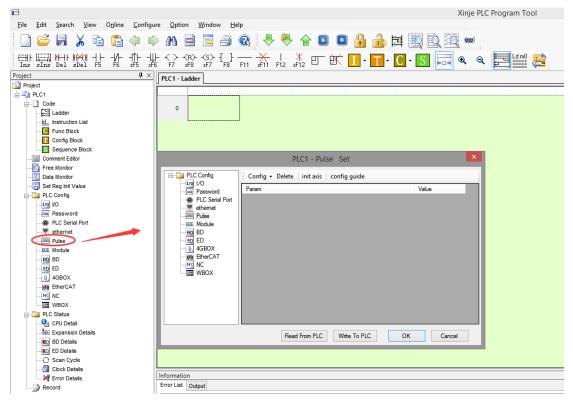
Example 1: According to the following figure, multi-segment absolute positioning is used.







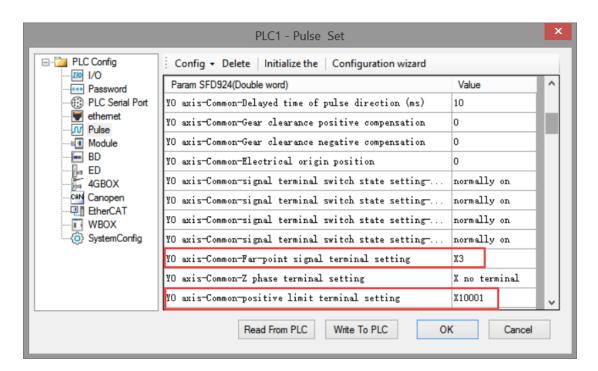
In the sample program, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

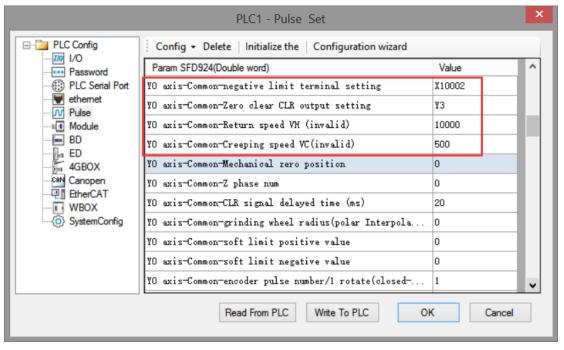


Click config, then select Y0 axis.

	PLC1 - Pulse Set	×
PLC Corfig	Config • Delete     init axis     config guide       V0 axis     Value       V1 axis     Y2 axis       Y2 axis     Y3 axis       Y4 axis     Y5 axis       Y6 axis     Y6 axis       Y7 axis     Y10 axis       Y11 axis     Y11 axis	
	Read From 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	<b>_</b>
	Read From PLC Write To PLC OK	Cancel	

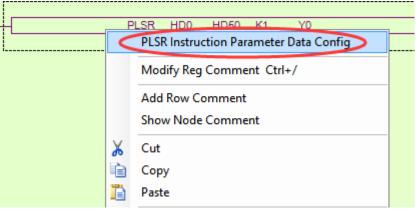




	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete 🛛 init axis 🔹 config guide		
Password	Param SFD962	Value	^
PLC Serial Port	YO axis-Common-Positioning completion time limit (ms	0	
	YO axis-group 1-Pulse default speed	10000	
	YO axis-group 1-Acceleration time of Pulse default s	200	
BD BD	YO axis-group 1-Deceleration time of pulse default s	200	
L 4GBOX	YO axis-group 1-Acceleration and deceleration time (ms)	10	
EtherCAT	YO axis-group 1-pulse acc/dec mode	linear acc/dec	c
	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	Cance	4

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 se	ction pulse output					×
	user params address: start execute section count:	HD50 system params:	K1	output:	YO		
Add Delete Upwards Dov	vnwards						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:

node:		arams address: accute section count:	HD50 system params: K1 0 Config	output: Y0	
Add D	elete Upwards Downwar	ds			
	îr equence	puise count	wait condition	wait register	iumn register
-	10000	50000	pulse sending complete	KO	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.

Then, right-click on the reverse positioning command PLSR and pop up the following options. Select the first "PLSR Instruction Parameter data Config":

i

	PLSR HD100 HD150 K1 Y0	
<	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
x	Cut	
È	Сору	
Ð	Paste	
	< ۵	PLSR Instruction Parameter Data Config         Modify Reg Comment Ctrl+/         Add Row Comment         Show Node Comment         Cut         Copy         Note

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	Jpwards Do	ownwards	1	1			1	

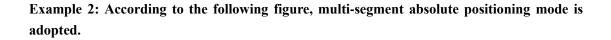
After choosing the mode, click the "Add" button in the configuration interface to add two continuous pulse parameters of forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

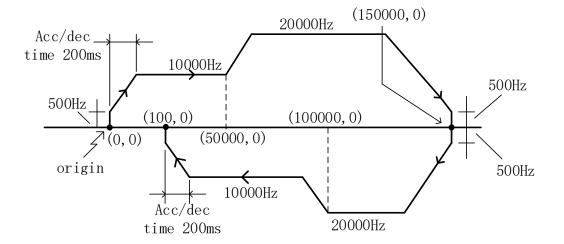
data start a mode:		arams address: xecute section count:	HD150 system params: K1 0 Config	output: Y0	
Add De	elete Upwards Downwar	ds		i	
	frequence	pulse count	wait condition	wait	jump rogistor
1	20000	100000	pulse sending complete	KO	KO
▶ 2	10000	100	pulse sending complete	KO	KO

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.

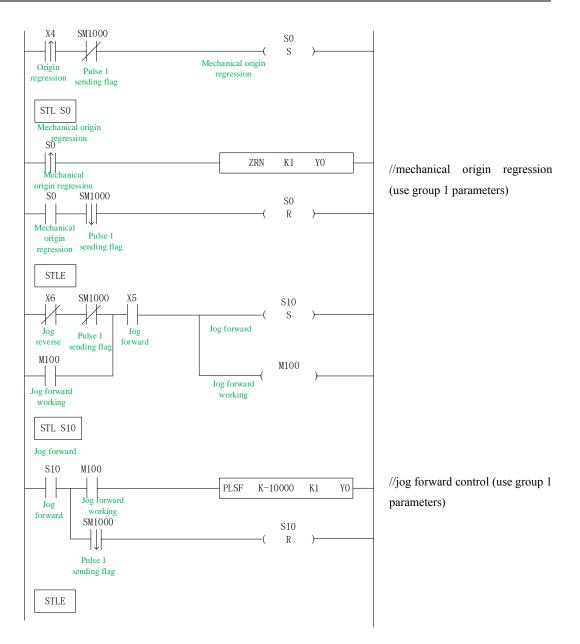
After downloading the program, power off the PLC and then re-energize it.

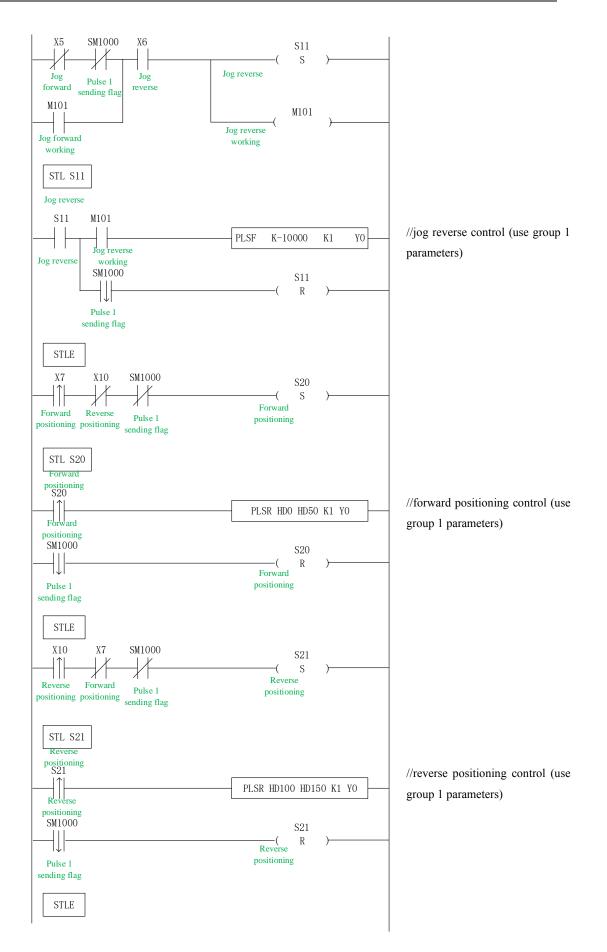
Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

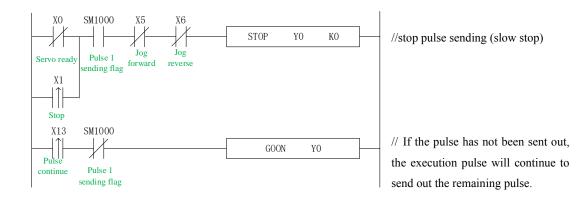




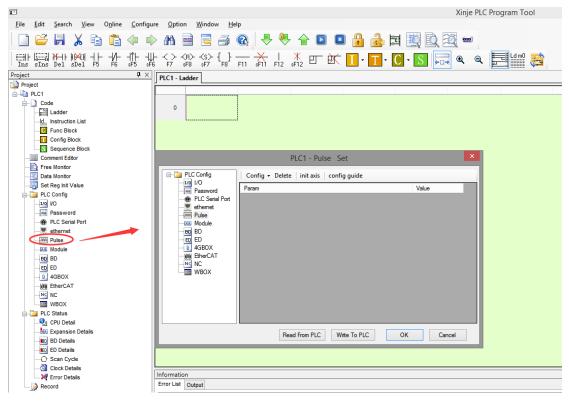
Firstly, make the ladder chart as follows:







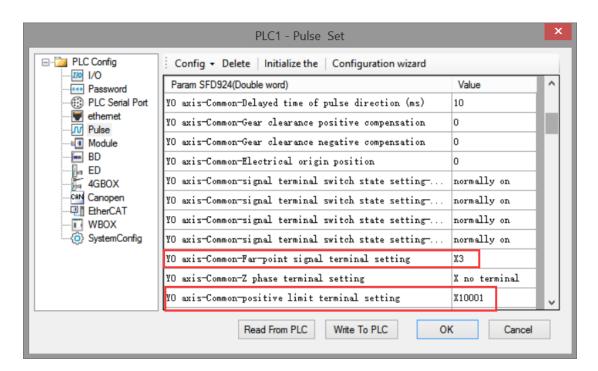
In the sample program, all the system parameters used in the pulse instructions are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

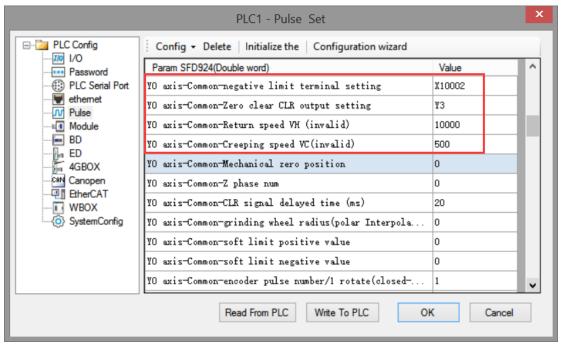


Click config, then select Y0 axis.

	PLC1 - Pulse Set	×
PLC Corfig	Config • Delete     init axis     config guide       V0 axis     Value       V1 axis     Y2 axis       Y2 axis     Y3 axis       Y4 axis     Y5 axis       Y6 axis     Y6 axis       Y7 axis     Y10 axis       Y11 axis     Y11 axis	
	Read From 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	<b>_</b>
	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)	0	~
	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	
X	Cut	
<b>b</b>	Сору	
- E	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							
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 D	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:

lata start addres:	s: HD0 user p	oarams address:	HD50	system params:	K1	output:	YO	
node:	relative 🗸 start e	execute section count:	0	Config	]			
Add Delete	Upwards Downwa	rds	1					
	frequence	pulse count		wait condition		wa		jump
1	10000	50000	թվ	se sending comp	lete	K		KO
2	20000	100000	թվ	se sending comp	lete	K	)	KO
2	20000	100000	թվ	se sending comp	lete	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	
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 🗸	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:

lata start ado	dress: HD100 user	params address:	HD150	system params:	K1	output:	Y0	
node:	relative 🗸 start	execute section count:	0	Config				
Add Dele	ete Upwards Downw	ards	1	1			1	
	fraquaraa	pulco count		moit condition		wa regi		jump register
1	20000	-50000	թվ	lse sending comp	lete	K		KO
2	10000	-99900	pu	lse sending comp	lete	K	)	KO

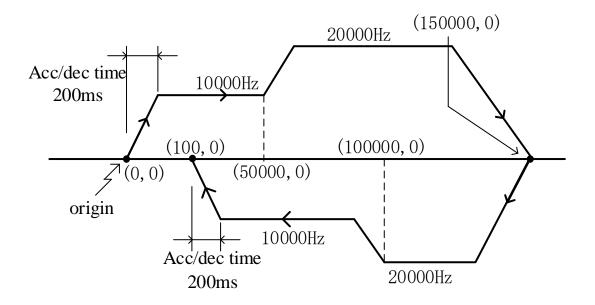
Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address 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.

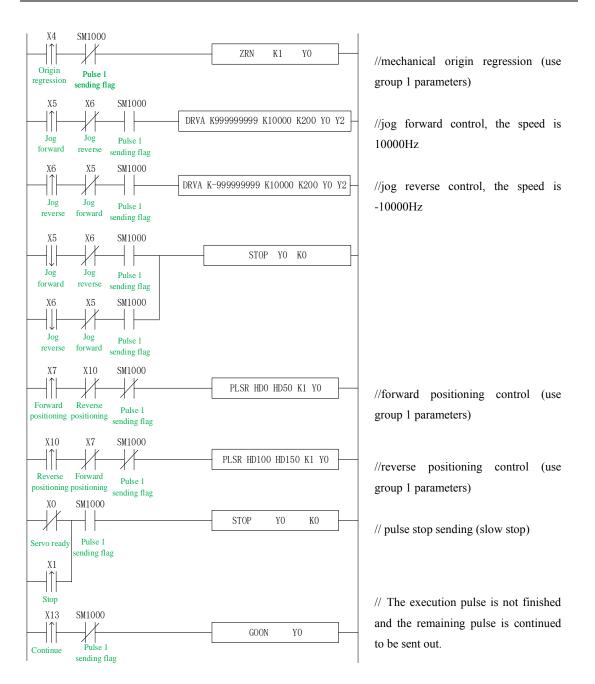
Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

## **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:

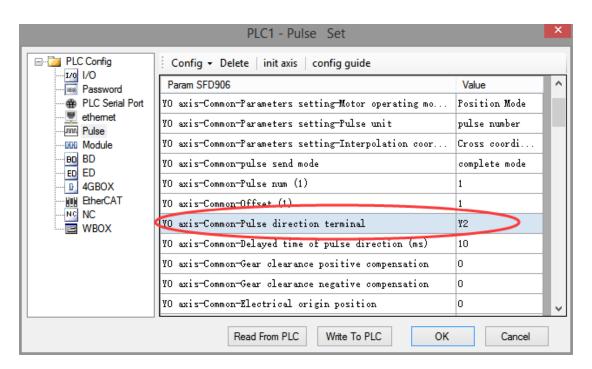


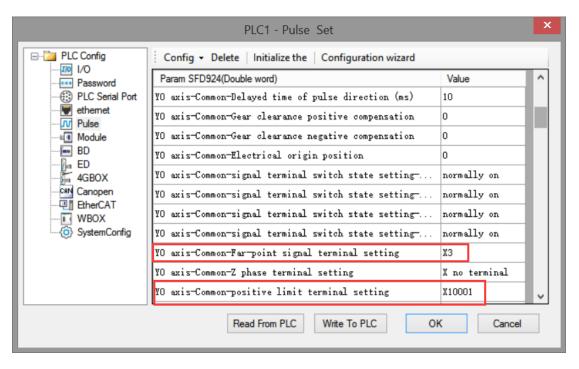
In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

<b>F</b>	Xinje PLC Program Tool
<u>File Edit Search View Online Configu</u>	re <u>Option Window H</u> elp
-	> AL 🖻 🖻 🔗 🔍 🐣 🐣 🍙 💶 🔒 🍰 🛱 🧱 🔯 🚥
	- < > < ſs> {s} -
Project # X	PLC1 - Ladder
Project	rtt - Lader
- PLC1	
☐ Code	0
Comment Editor	PLC1 - Pulse Set
Free Monitor	
Data Monitor	PLC Config → Delete   init axis   config guide
Set Reg Init Value	Param Value
E-D PLC Config	Param Value
I/0 VO	ethemet
Password	- Inn Pulse
PLC Serial Port	
Pulse	
DOD Module	- Kin EtherCAT
BD BD	
ED ED 4GBOX	WBOX
WIN EtherCAT	
WBOX	
PLC Status	
CPU Detail	
BD Details	Read From PLC Write To PLC OK Cancel
ED Details	
C Scan Cycle	
Clock Details	
K Error Details	Information
- Decord	Error List Output

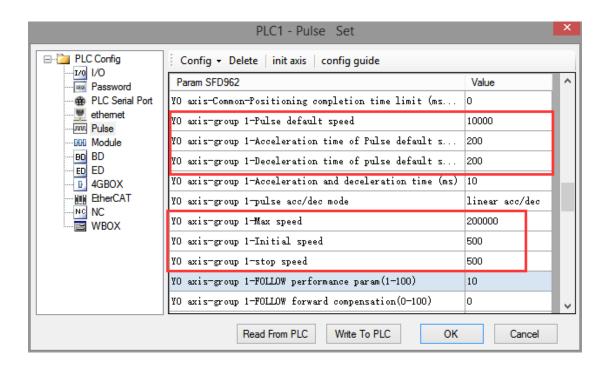
Click config, then select Y0 axis.

	PLC	1 - 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			
4GBOX	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Can	cel





	PLC1 - Pulse Set		×
PLC Config	Config • Delete   Initialize the   Configuration wizard		
Password	Param SFD924(Double word)	Value	^
PLC Serial Port	YO axis-Common-negative limit terminal setting	X10002	
ethemet	YO axis-Common-Zero clear CLR output setting	¥З	
Module	YO axis-Common-Return speed VH (invalid)	10000	
BD	YO axis-Common-Creeping speed VC(invalid)	500	
4GBOX	YO axis-Common-Mechanical zero position	0	
CAN Canopen	YO axis-Common-Z phase num	0	
	YO axis-Common-CLR signal delayed time (ms)	20	
SystemConfig	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 O	K 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":

F	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 "absolute" (default is "relative"), as shown in the following figure:

multi section pulse output										
data start address: HI	)0 user p	arams address:	HD50	system params:	K1	output:	YO			
mode:	solut v start e	xecute section count:	0	Config						
Add Delete Upw	ards Downwa	rds								
fre	quence	pulse count		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:

lata start ad node:		erams address: execute section count:	HD50 system params: K1 0 Config	output: Y0	
Add Del	ete Upwards Downwa	rds			
	fr equence	pulse count	wait condition	wait register	iumn register
1	10000	50000	pulse sending complete	KO	KO
▶ 2	20000	150000	pulse sending complete	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	
b	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:

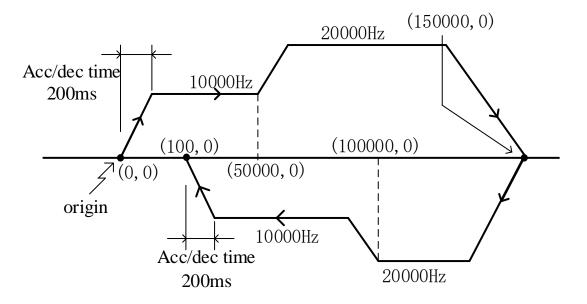
data start ad mode:		arams address: xecute section count:	HD150 system params: K1 0 Config	output: Y0	
Add Del	ete Upwards Downwa	rds			
	frequence	pulse count	wait condition	wait register	jump rogistor
1	20000	100000	pulse sending complete	KO	KO
▶ 2	10000	100	pulse sending complete	KO	KO

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.

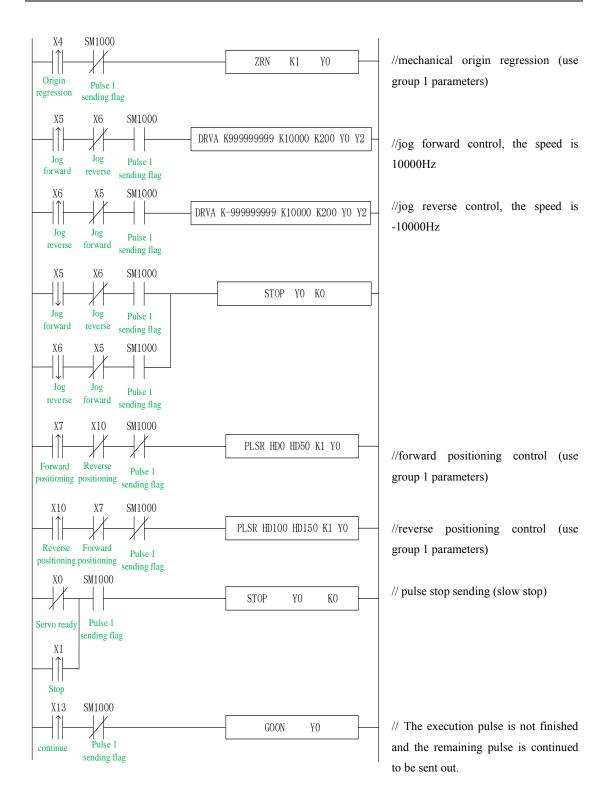
After downloading the program, power off the PLC and then re-energize it.

Positive Limit (X10001) and Negative Limit (X10002) 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:

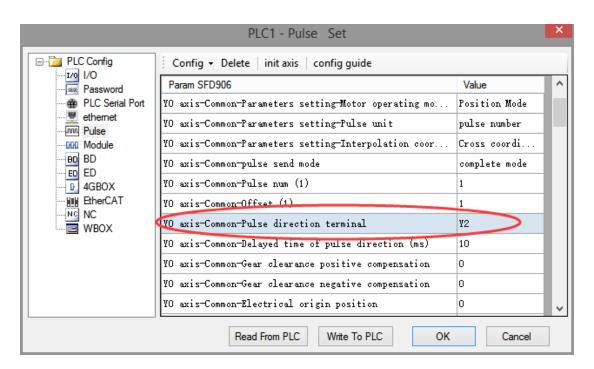


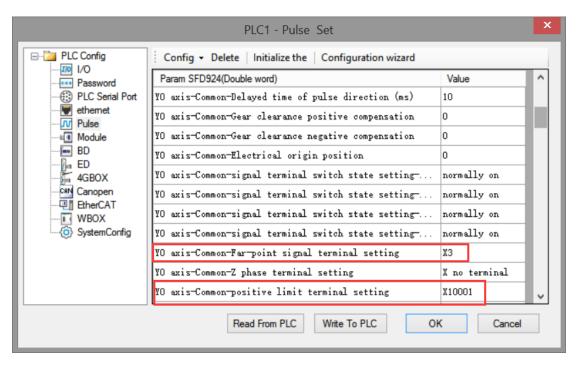
In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

T	Xinje PLC Program T	ool
<u>File E</u> dit <u>S</u> earch <u>V</u> iew O <u>n</u> line <u>C</u> onfigu	re <u>O</u> ption <u>W</u> indow <u>H</u> elp	
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Project 🛛 🛱 🗙	PLC1 - Ladder	
Project		
E PLC1		
Code	0	
Ladder		
Instruction List		
Func Block		
Config Block		
Sequence Block	PLC1 - Pulse Set	
Free Monitor	PLCI - Puise Set	
Data Monitor	🖃 🔁 PLC Config 🗧 Config 👻 Delete   init axis   config guide	
Set Reg Init Value		
E- DLC Config	A Password	
VO	etc Serial Port     etc Serial Port	
Password		
PLC Serial Port	- Gio Module	
ethernet	-eo, BD	
Pulse		
DDD Module	-D 4GBOX	
BD BD	HIN EtherCAT	
ED ED		
<b>b.</b> 4GBOX	WEOX	
NC NC		
WBOX		
E PLC Status		
	Read From PLC Write To PLC OK Cancel	
BD Details		
ED Details		
C Scan Cycle		
Clock Details	Information	
Kerror Details	Error List Output	
Record		

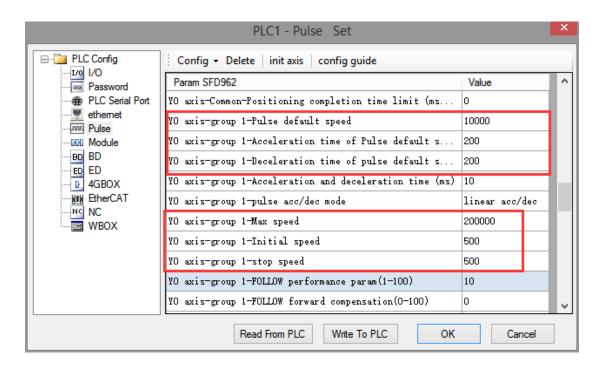
Click config, then select Y0 axis.

	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





	PLC1 - Pulse Set		×
PLC Config	Config • Delete   Initialize the   Configuration wizard		
Password	Param SFD924(Double word)	Value	^
PLC Serial Port	YO axis-Common-negative limit terminal setting	X10002	
ethemet	YO axis-Common-Zero clear CLR output setting	¥З	
Module	YO axis-Common-Return speed VH (invalid)	10000	
BD	YO axis-Common-Creeping speed VC(invalid)	500	
4GBOX	YO axis-Common-Mechanical zero position	0	
CAN Canopen	YO axis-Common-Z phase num	0	
EtherCAT     WBOX	YO axis-Common-CLR signal delayed time (ms)	20	
SystemConfig	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 O	K Cance	el



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":

	LSR HD0 HD50 K1 Y0	
<	PLSR Instruction Parameter Data Config	<u> </u>
	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:	Y0	
	mode:	relative 🗸	start execute section count:	0	Config				
L	Add Delete U	Upwards D	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	
	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:	HD100	user params address:	HD150	system params:	K1	output:	Y0	
L	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 reverse rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

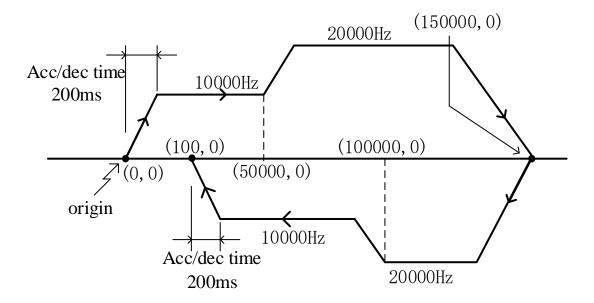
		multi see	ction pulse output		
data start ac	ddress: HD100 user pa	rams address:	HD150 system params: K1	output: Y0	
mode:	relative ❤ start exe	ecute section count:	0 Config		
Add De	lete Upwards Downward	ls			
	fraquaraa	pulso count	woit condition	wait register	jump register
1	20000	-50000	pulse sending complete	KO	KO
2	10000	-99900	pulse sending complete	KO	KO
used space:	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.

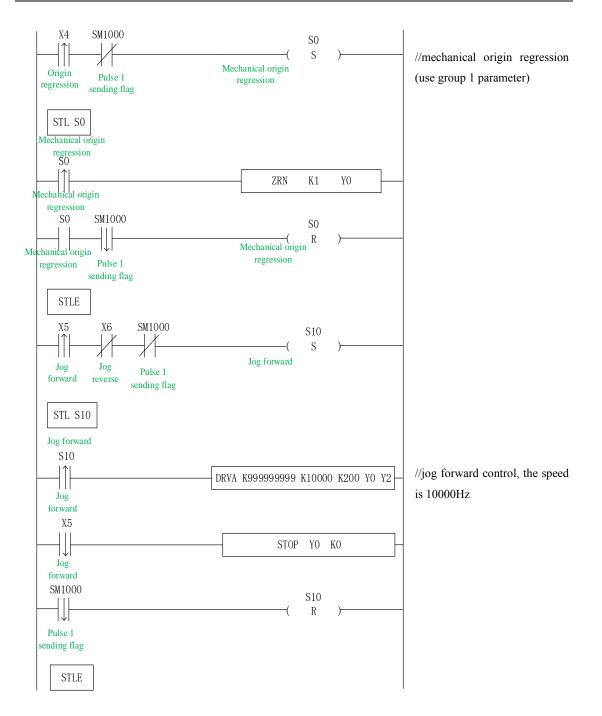
After downloading the program, power off the PLC and then re-energize it. Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

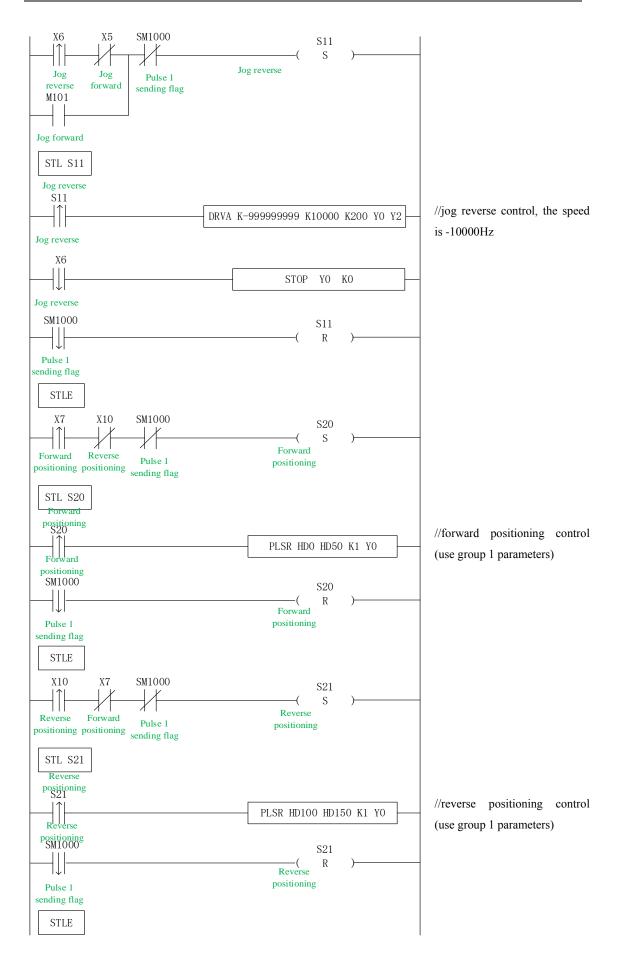
**1-5-7.** Forward and reverse rotation multi-segment process program **[DRVI, DRVA, PLSR, ZRN]** 

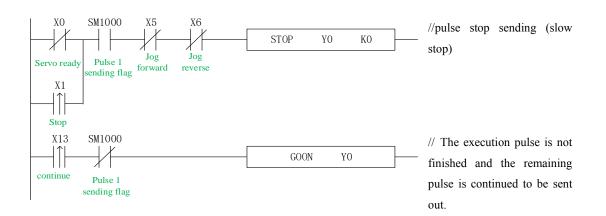
Example 1: According to the following figure, multi-segment absolute positioning mode is adopted.



Firstly, make the ladder chart as follows:







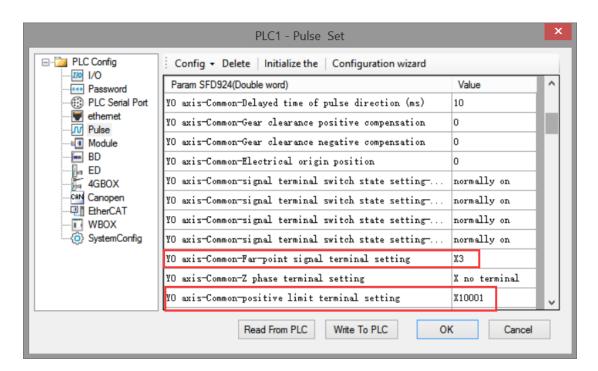
In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

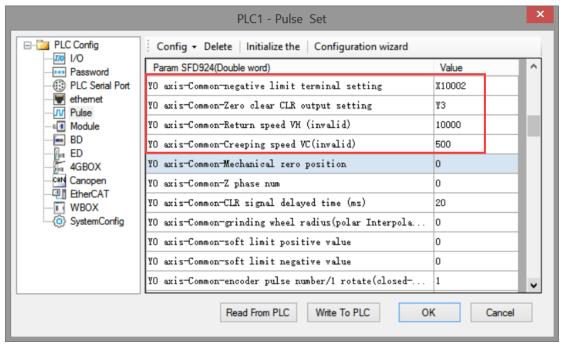
<b>1</b>	Xinje PLC Program Tool	
<u>File Edit Search View Online Configu</u>	ire <u>O</u> ption <u>W</u> indow <u>H</u> elp	
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Ins sIns Del sDel F5 F6 sF5 sF		
Project # ×	PLC1 - Ladder	
Project		
⊨-Ea PLC1 ⊨] Code		
Ladder	0	
Id Instruction List		
Config Block		
Sequence Block		
Comment Editor	PLC1 - Pulse Set	
Data Monitor	Init axis   config guide     Init axis   config guide     Init axis   config guide	
Set Reg Init Value	Param Value	
PLC Config	PLC Serial Port	
Password	- vertex ethemet	
PLC Serial Port	- Time Pulse	
ethernet		
Pulse		
DDQ Module	4GBOX	
BD BD	- WW EtherCAT	
<u>ED</u> ED		
B 4GBOX		
EtherCAT		
PLC Status		
CPU Detail		
Expansion Details		
BD Details	Read From PLC Write To PLC OK Cancel	
ED Details		
🙆 Clock Details		
	Information	
Record	Error List Output	

Click config, then select Y0 axis.

	PLC1 - Pulse Set	×
PLC Corfig	Config •     Delete     init axis     config guide       V0 axis     Value       V1 axis       Y2 axis       Y3 axis       Y4 axis       Y5 axis       Y6 axis       Y7 axis       Y10 axis       Y11 axis	
	Read From PLC Write To PLC OK	Cancel

		PLC1 - Pulse Set		×
6	PLC Config	Config 👻 Delete 🛛 init axis 🔷 config guide		
L	Password	Param SFD906	Value	^
L	PLC Serial Port	YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
L	ethernet	YO axis-Common-Parameters setting-Pulse unit	pulse number	
L	Module	YO axis-Common-Parameters setting-Interpolation coor	Cross coordi	
L	ED BD	YO axis-Common-pulse send mode	complete mode	
L	4GBOX	YO axis-Common-Pulse num (1)	1	
L	EtherCAT	YO axis-Common-Offset (1)	1	
L		VO axis-Common-Pulse direction terminal	¥2	
L		YO axis-Common-Delayed time of pulse direction (ms)	10	
L		YO axis-Common-Gear clearance positive compensation	0	
L		YO axis-Common-Gear clearance negative compensation	0	
L		YO axis-Common-Electrical origin position	0	<b>~</b>
		Read From PLC Write To PLC OK	Cancel	

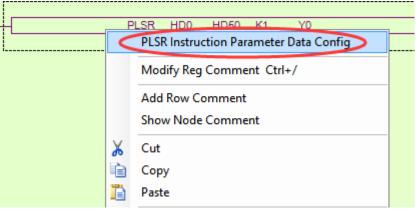




	PLC1 - Pulse Set		×
PLC Config	Config 👻 Delete 🛛 init axis 🔹 config guide		
Password	Param SFD962	Value	^
PLC Serial Port	YO axis-Common-Positioning completion time limit (ms	0	
	YO axis-group 1-Pulse default speed	10000	
	YO axis-group 1-Acceleration time of Pulse default s	200	
BD BD	YO axis-group 1-Deceleration time of pulse default s	200	
L 4GBOX	YO axis-group 1-Acceleration and deceleration time (ms)	10	
EtherCAT	YO axis-group 1-pulse acc/dec mode	linear acc/dec	c
	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	Cance	4

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 Dov	Add Delete Upwards Downwards							
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:

node:		arams address:	HD50 system params: K1 0 Config	output: Y0	
Add [	Delete Upwards Downwar	ds		· · · ·	
Îr equence		puise 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":

i

	PLSR HD100 HD150 K1 Y0	
 <	PLSR Instruction Parameter Data Config	
	Modify Reg Comment Ctrl+/	
	Add Row Comment	
	Show Node Comment	
x	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 section pulse 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 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:

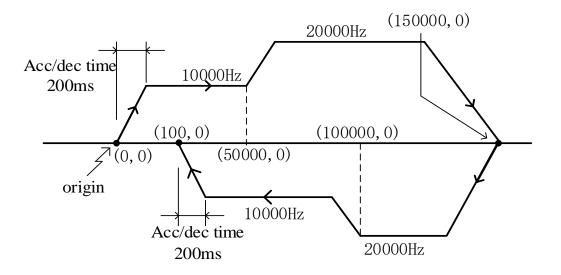
node:		rrams address: ecute section count:	HD150 system params: K1 0 Config	output: Y0		
Add Delete Upwards Downwards						
	frequence	pulse count	wait condition	register	jump rogistor	
1	20000	100000	pulse sending complete	KO	KO	
<b>▶</b> 2	10000	100	pulse sending complete	KO	KO	

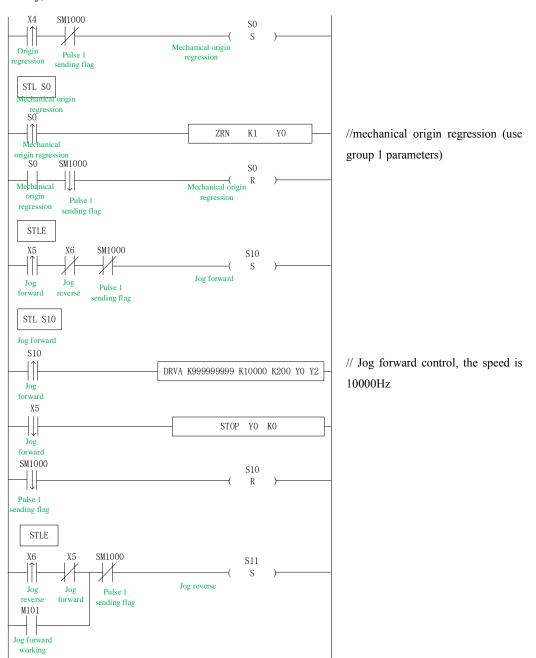
Note: Please note the range of real-time occupied registers displayed by "used space". Because the range of starting address of pulse parameter data of PLSR pulse instruction is HD100-HD129, and the range of system parameter block address is HD150-HD153, the range of real-time occupied registers address 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.

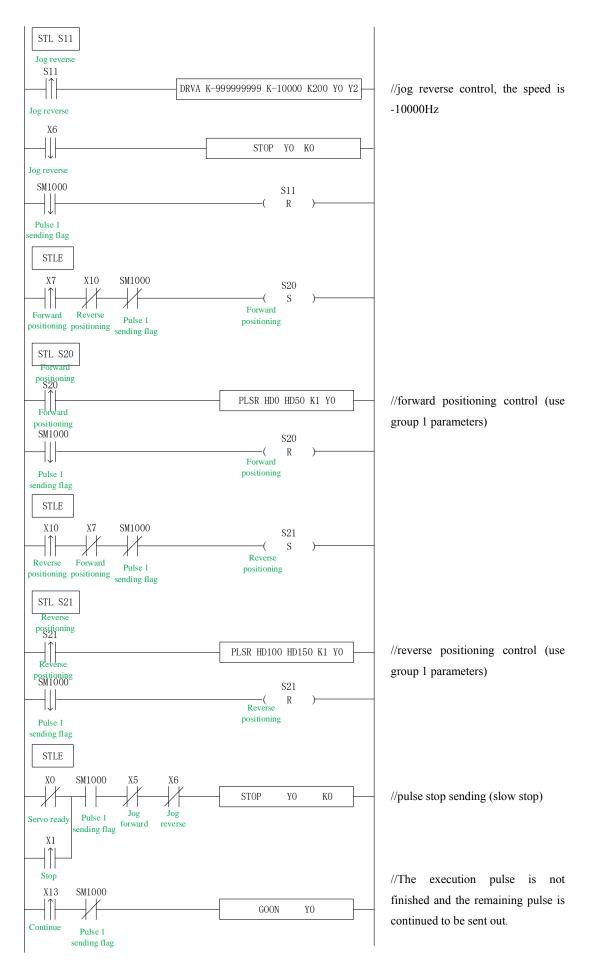
Positive Limit (X10001) and Negative Limit (X10002) will play an important role in the execution of ZRN, PLSF, DRVI and DRVA instructions.

# Example 2: According to the following figure, multi-segment relative positioning method is used.





Firstly, make the ladder chart as follows:



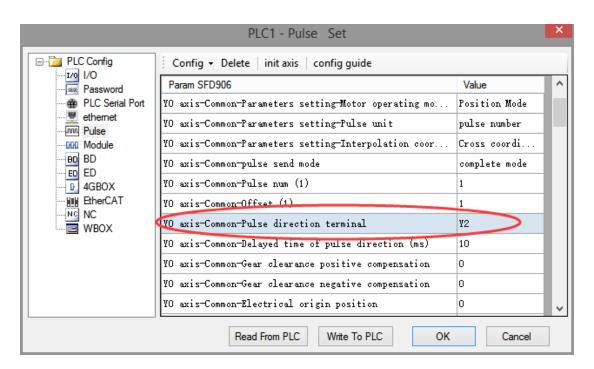
In the sample program, all the system parameters used in the pulse instructions (except DRVA, DRVI) are group 1 parameters. So, we click "pulse configuration parameters" in the PLC programming software, as follows:

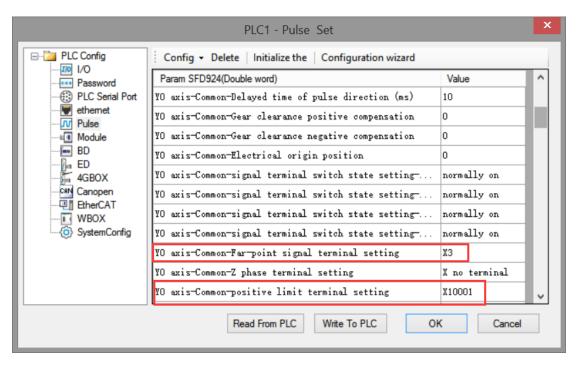
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Here since bel abel Here since bel abel   Project   Projec	<u>File Edit Search View Online Configu</u>	ure <u>O</u> ption <u>W</u> indow <u>H</u> elp	
Project       # ×         Pr	📄 😅 📕 👗 🖻 🧯 🖨	> AN 🖻 📃 🚑 🚱 🐣 🌺 🎓 🖸 🚨 🔒 🍰 🛱 🧱 🗟 📼	
Project  Procet  Code  Procet  Procet Pr	Ins sIns Del sDel F5 F6 sF5 sF	┟╶、ンーマタンー{\$}≻{};} {	
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Instruction List     Config Block     Sequence Block     Sequence Block     Config Block     Sequence Block     Config     Cate Montor     Set Reg bit Value     Pric Senial Bont     Pric Senial Bont     Pric Senial Bont     Pric Senial Bont     Price Montor     Price Benial Bont			
Func Block     Grang Bloc			
Config Block   Sequence Block   Sequence Block   Pree Montor   Data Montor   Star Reg Int Value   P.C Config   P.L C Config   P.C Config   P.L C Config   P.C Config			
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Image: Set Reg Int Value       Image: Set Reg Int Value         Image: PLC Config       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Int Value         Image: PLC Set Information       Image: Set Reg Information         Image: PLC Value       Image: PLC Value         Image: PLC Value       Image: PLC Value         Image: PLC Set Information       Image: PLC Value         Image: PLC Value       Image: PLC Value         Image: PLC Value </td <td></td> <td>PLC Config Config - Delete init axis config quide</td> <td></td>		PLC Config Config - Delete init axis config quide	
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CPU Details			
Og CPU Detail       Model			
Image: Second Details     Read From PLC     Write To PLC     OK     Cancel       Image: Second Details     Image: Second Details     Image: Second Details     Image: Second Details       Image: Second Details     Image: Second Details     Image: Second Details     Image: Second Details       Image: Second Details     Image: Second Details     Image: Second Details     Image: Second Details       Image: Second Details     Image: Second Details     Image: Second Details     Image: Second Details			
BD Details     Head from FLC     Vitte to FLC     Vitte to FLC     Vitte to FLC       BD Details			
ED Details  C Scan Cycle  C Ock Details  Information  ✓ Error Details  Front Det		Read From PLC Write To PLC OK Cancel	
→ Scan Cycle       → Cock Details       → Error Details			
Verror Details			_
Becord Error List Output			
2 ······	Record	Error List Output	

Click config, then select Y0 axis.

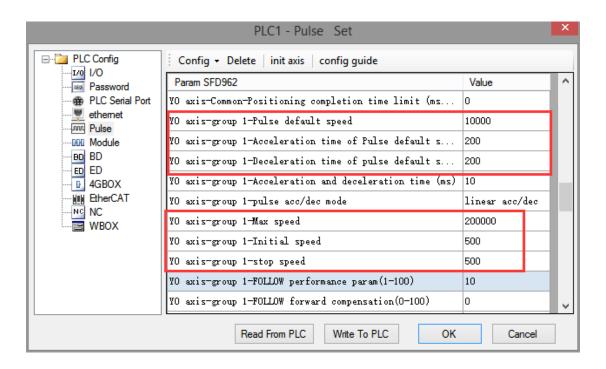
	PLC	1 - Pulse Set		×
PLC Config	Config - Delete i	nit axis 🛛 config guide		
Password	Y0 axis		Value	
PLC Serial Port	Y1 axis			
ethemet	Y2 axis			
	Y3 axis			
BD BD	Y4 axis			
ED ED	Y5 axis			
GBOX	Y6 axis			
NC NC	Y7 axis			
WBOX	Y10 axis			
	Y11 axis			
	Read Fr	om PLC Write To PLC	OK Cance	4

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





	PLC1 - Pulse Set		×
PLC Config	Config • Delete   Initialize the   Configuration wizard		
Password	Param SFD924(Double word)	Value	^
PLC Serial Port	YO axis-Common-negative limit terminal setting	X10002	
ethemet	YO axis-Common-Zero clear CLR output setting	¥З	
Module	YO axis-Common-Return speed VH (invalid)	10000	
BD	YO axis-Common-Creeping speed VC(invalid)	500	
4GBOX	YO axis-Common-Mechanical zero position	0	
CAN Canopen	YO axis-Common-Z phase num	0	
EtherCAT     WBOX	YO axis-Common-CLR signal delayed time (ms)	20	
SystemConfig	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 O	K Cance	el



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":

	LSR HD0 HD50 K1 Y0	
<	PLSR Instruction Parameter Data Config	<u> </u>
	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:	Y0	
	mode:	relative 🗸	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 forward rotation; after configuring, click the "Write to PLC" button to write parameters into the PLC, as shown in the following figure:

	node: start execute 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	
	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:	HD100	user params address:	HD150	system params:	K1	output:	Y0	
L	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 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		×		
da	data start address: HD100 user params address: HD150 system params: K1 output: Y0							
m	ode:	relative 🗸	ecute section count:	0 Config				
Đ	Add D	elete Upwards Downward	ls					
Γ		fraguarda	pulco count	wait condition	wait register	jump register		
	1	20000	-50000	pulse sending complete	KO	KO		
	2	10000	-99900	pulse sending complete	KO	KO		
use	ed space	: 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 (X10001) and Negative Limit (X10002) 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	

	out related sepcial registe		
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		
	low 16-bit (the unit is		
SD1006	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1007	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		PULSE_1
SD1008	pulse equivalent)		reppr_r
	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	
		per rotation and the movement per rotation is	
		0	
		3: System parameter block number error	
		4: Pulse parameter block number exceeding	
		4. Pulse parameter block number exceeding maximum limit	
		5: Stop after encountering positive limit signal	
SD1010	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 $\leq 0$	
		or >100	
		16:Follow Feedforward Compensation <0	

#### Pulse output related sepcial registers:

		> 100	]
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio $\leq 0$ 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 blad		
SD1011	Error pulse data block		
SD1011	number		
	Ducant		
GD1020	Present segment		
SD1020	(represents segment n)		
SD1021			
	Present pulse number		
	low 16-bit (the unit is		
SD1022	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1023	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1024	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1025	pulse equivalent)		
	Present pulse number		PULSE_2
	low 16-bit (the unit is		
SD1026	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1027	pulse number)		
	Present pulse number		
	low 16-bit (the unit is		
SD1028	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1029	pulse equivalent)		
		1: pulse data segment configuration error	
		2: In equivalent mode, the number of pulses	
SD1030	Pulse error information	per rotation and the movement per rotation is	
		0	
		V	

		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 $\leq 0$	
		or >100	
		16:Follow Feedforward Compensation <0	
		or>100	
		17:Follow Multiplication Coefficient and	
		Division Coefficient Ratio $\leq 0$ 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		
501051	number		
	Present segment		
SD1040	(represents segment n)		
SD1040	(represents segment ii)		
	Present pulse number		
	low 16-bit (the unit is		
SD1042	pulse number)		
	Present pulse number		
	high 16-bit (the unit is		
SD1043	pulse number)		PULSE_3
	Present pulse number		
	low 16-bit (the unit is		
SD1044	pulse equivalent)		
	Present pulse number		
	high 16-bit (the unit is		
SD1045	pulse equivalent)		
001046	Present pulse number		
SD1046	low 16-bit (the unit is		

	pulse number)		
SD1047	Present pulse number high 16-bit (the unit is pulse number) Present pulse number		
SD1048	low 16-bit (the unit is pulse equivalent) Present pulse number high 16-bit (the unit is		
SD1049	pulse equivalent)		
SD1050	Pulse error information	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 $\geq$ VH 13: Origin regression signal error 15:Follow Performance Parameters $\leq 0$ or >100 16:Follow Feedforward Compensation <0 or>100 17:Follow Multiplication Coefficient and Division Coefficient Ratio $\leq 0$ 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	
SD1051	Error pulse data block number		
SD1060	Present segment		PULSE_4

	(represents 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)		
SD1065	Present pulse number high 16-bit (the unit is pulse equivalent) Present pulse number		
SD1066	low 16-bit (the unit is pulse number)		
SD1067	Present pulse number high 16-bit (the unit is pulse number)		
SD1068	Present pulse number low 16-bit (the unit is pulse equivalent)		
SD1069	Present pulse number high 16-bit (the unit is pulse equivalent)		
SD1070	Pulse error information	1: pulse data segment configuration error2: In equivalent mode, the number of pulsesper rotation and the movement per rotation is03: System parameter block number error4: Pulse parameter block number exceedingmaximum limit5: Stop after encountering positive limit signal6: Stop after meeting the negative limit signal10: No origin signal is set for origin regression11:Velocity of origin regression VH is 012: Origin regression crawling speed VC is 0or VC $\geq$ VH13: Origin regression signal error15:Follow Performance Parameters $\leq 0$ or >10016:Follow Feedforward Compensation <0	

		Division Coefficient Ratio $\leq 0$ 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		
SD1071	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)		PULSE_4

	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)	

# **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		nts	Three points arc	2-4-8
ARC three point		point	Three points arc, maximum speed can be specified separately	
VM				
ARC three point 7		point	Three points arc, can specify the starting speed, terminal speed	2-4-8
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					
Insert - Edit Delete Upwards Downwards Common Item Pulse Item Wait Item Read/Write Module(FROM/TO) G Item	output				
Read/Write SD Module	OK Cancel				

2. it will show the following window

		Edit Sequence E	Block 1		
Commer		G Instructio	on	×	
	Skip	Comment: fast posit	ion		
; Inser	DRV fast p	position		~	_
Index		Params	Register	Absolute	
	•	final position	DO	Absolute	
		final position	D2	Absolute	
		axis 1	YO	params	
		axis 2	¥1	params	
_			ОК	Cancel	
				UK Cance	el

3. click the dropdown menu, select the motion control instruction to

Edit Sequence Block 1					
Commer	G Instruction ×				
	Skip Comment: clockwise VBEM				
Inser	CW_R clockwise VBEM V				
Index	DRV fast position DRVR fast position(polar) LIN line LIN line VM LIN line VBEM CW clockwise CW clockwise VM CCW anticlockwise CCW anticlockwise VM CCW anticlockwise VM CCW anticlockwise VBEM CW_R clockwise VBEM CW_R clockwise VBEM CCW_R anticlockwise VBEM CCW_R anticlockwise VM CCW_R anticlockwise VM CCW_R anticlockwise VBEM ARC three point ARC three point VM ARC three point VM ARC three point VM	ancel			

4. click the motion control instruction CW clockwise, it will show the instruction configuration window:

G Instruction					
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	Ψ1	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	×			
		0 110110				Config • Delete   init axis   config guide	
2	Skip	Comment: clock	vise		- 11	Param SFD901 bit0	Value
	CW clockwi	ise		×		YO axis-Common-Parameters setting-Pulse direction logic	positive logic
		-			- 11	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
L		final position	D2	Absolute		YO axis-Common-Parameters setting-Pulse unit	pulse number
L		center position	D4 Rela	Relative		YO axis-Common-Parameters setting-Interpolation coor	Cross coordi
		center position	D6	Relative		YO axis-Common-pulse send mode	complete mode
L	•	axis 1	YO	params		YO axis-Common-Pulse num (1)	1
		axis 2	Ψ1	params		YO axis-Common-Offset (1)	1
L						YO axis-Common-Pulse direction terminal	Y no terminal
L			ОК	Cancel		YO axis-Common-Delayed time of pulse direction (ms)	10
				ОК		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:

Comment: Sec		Edit Sequen wards Downwards			
Index	Skip	Comment	Output	D20 10 11	
1		clockwise	CW DO D10 D20	) D3O 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日	M0						- 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 XG series and the configuration of the parameters of each axis pulse.

#### 2-3-1. Pulse output port distribution

In all transistor output terminals of XG series PLC, the operation axes of axis 1 and axis 2 can be arbitrarily specified, and the corresponding direction terminals can also be arbitrarily specified. **XG1-16T4** 

Output terminal	Y0~Y3	Y4~Y7
Function	Pulse output	Direction output

#### XG2-26T4

Output terminal	Y0~Y3	Y4~Y7
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	
	Enable soft limit	Common	Only need to set axis 1
		parameter	
	Pulse unit	Common	Only need to set axis 1
		parameter	
Common	Pulse number	Independent	Axis 1 and 2 need to be set
parameter		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	

	1		
	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	

Note: The above table is applicable to all motion control instructions except DRV and DRVR.

<b>DRV and DRVF</b>	R instructions used	l 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	
	Pulse unit	Common	Only need to set axis 1
		parameter	
	Pulse number	Independent	Axis 1 and 2 need to be set
		parameter	
Common	Offset	Independent	Axis 1 and 2 need to be set
parameters		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 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 positioning [DRV]					
16-bit	-	32-bit	DRV		
instruction		instruction			
Execute	Rise/fall edge of coil	Suitable	XG1, XG2		
condition		model			
Firmware	-	Software	-		

#### 2. operand

Operand	Function	Туре
S0	The target position of axis 1	Double words, 32-bit
<b>S</b> 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					Syst	em				Constant	Mod	lule
		$D^*$	FD	TI	)*	CD*	DX	DY	DM*	$DS^*$	K/H	ID	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
Bit	Operand				Sy	stem							
		Х	Y	M*	S*	T*	<b>C</b> *	Dnn	1				
	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.

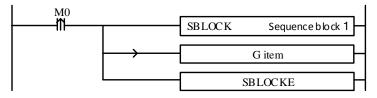
#### 4. Parameter setting

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

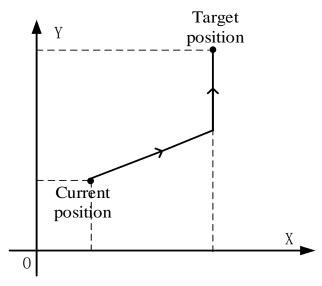
port		
Axis 1 direction port	Arbitrarily specify idle output points, set in system parameters	Must set
Axis 2 direction port	Arbitrarily specify idle output points, set in system parameters	Must set
Pulse unit	Setting in System Parameters of Axis 1	Must set
Pulse default speed	Specify in group 1 parameters of the system parameters of each axis	Must set
Acceleration time	Specify in group 1 parameters of the system parameters of each axis	No need to set
Deceleration time	Specify in group 1 parameters of the system parameters of each axis	No need to set

#### 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 Instructi	on	×
Skip	Comment: fast pos	ition	
DRV fast position			¥
	Params	Register	Absolute
► SO fine	al position	DO	Absolute
S1 fine	al position	D2	Absolute
DO	axis 1	УО	params
D1	axis 2	Ψ1	params
		ОК	Cancel

#### **Command configuration**

	PLC1 - Pulse Set			×
	Config - Delete   init axis   config guide			
	Param SFD906	Valu	e	^
	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		
1	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-1um(revolve)	1		
	YO axis-Common-Pulse direction terminal	¥4		
1	YO axis-Common-Delayed time of pulse direction (ms)	10		<b>~</b>
	Read From PLC Write To PLC OK		Cancel	

Y0 axis system parameters (1)

Config 👻 Delete   init axis   config guide		
Param SFD954	Value	1
YO axis-Common-Rated speed corresponding frequency (	0	
YO axis-Common-Positioning completion time limit (ms	0	Ш
YO axis-group 1-Pulse default speed	1000	11
YO axis-group 1-Acceleration time of Pulse default s	50	Ш
YO axis-group 1-Deceleration time of pulse default s	50	16
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	11
YO axis-group 1-Initial speed	0	11
YO axis-group 1-stop speed	0	11
YO axis-group 1-FOLLOW performance param(1-100)	10	1,

#### Y0 axis 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	
Y1 axis-Common-Parameters setting-enable soft limit	disable		
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	1 um		
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi	
¥1 axis-Common-pulse send mode	complete	mode	
Y1 axis-Common-Pulse num (1)	1		
¥1 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	

#### Y1 axis system parameters (1)

Config 🝷 Delete 🛛 init axis 🔷 config guide			
Param SFD1084	Value		1
¥1 axis-Common-Rated speed corresponding frequency (	0		
Y1 axis-Common-Positioning completion time limit (ms	0		
Y1 axis-group 1-Pulse default speed	1000		
Y1 axis-group 1-Acceleration time of Pulse default s	50		
Y1 axis-group 1-Deceleration time of pulse default s	50		h
Y1 axis-group 1-Acceleration and deceleration time (ms)	10		
Y1 axis-group 1-pulse acc/dec mode	linear a	.cc/dec	
Y1 axis-group 1-Max speed	100000		
Y1 axis-group 1-Initial speed	0		
Y1 axis-group 1-stop speed	0		
Y1 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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:

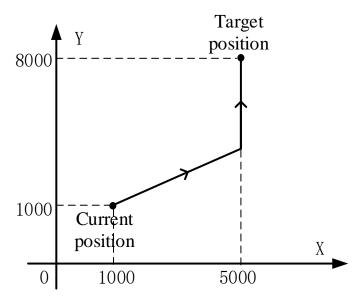
(1) If the final position is absolute mode, the target position is (5000,2000).

- (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!

Example 1As shown in the figure below, the current position coordinates of the worktable<br/>are (1000,1000) and the target coordinates are (5000,8000). The two axes are<br/>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	 SBLOCK	Sequence block 1	
	 G item		
	SBLOCKE		

G item configurations:

	G Instruct	ion	×
Skip	Comment: fast po	sition	
DRV fast p	osition		*
	Params	Register	Absolute
	final position	K5000	Absolute
	final position	K8000	Absolute
•	axis 1	ΥО	params
	axis 2	¥1	params
		ОК	Cancel

Absolute mode

G Instruct	ion	×
Skip Comment: fast pos	sition	
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 Mode					
YO axis-Common-Parameters setting-Pulse unit	1 นท					
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-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					

Config 👻 Delete 🛛 init axis 📄 config guide		
Param SFD906	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	

PLC1 - Pulse Set Config 👻 Delete 🛛 init axis 🔷 config guide ٨ 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	
YO axis-group 1-Pulse default speed	1000	
YO axis-group 1-Acceleration time of Pulse default s	30	
YO axis-group 1-Deceleration time of pulse default s	30	
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	
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	

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	
V1 axis-Common-Parameters setting-Pulse unit	1 um	
V1 axis-Common-Parameters setting-Interpolation coor	Cross coordi	
Y1 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	I
¥1 axis-Common-Gear clearance positive compensation	0	
Y1 axis-Common-Gear clearance negative compensation	0	
Y1 axis-Common-Electrical origin position	0	
V1 axis-Common-signal terminal switch state setting	normally on	
Y1 axis-Common-signal terminal switch state setting	normally on	
V1 axis-Common-signal terminal switch state setting	normally on	
V1 axis-Common-signal terminal switch state setting	normally on	
V1 axis-Common-Far-point signal terminal setting	X no terminal	1
¥1 axis-Common-Z phase terminal setting	X no terminal	
V1 axis-Common-positive limit terminal setting	X no terminal	
V1 axis-Common-negative limit terminal setting	X no terminal	16

PLC1 - Pulse Set Config 👻 Delete 🛛 init axis 🔷 config guide ۸ 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 V1 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	Ŀ
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	
Y1 axis-group 1-Acceleration and deceleration time (ms)	10	
Y1 axis-group 1-pulse acc/dec mode	linear acc/dec	l.
Y1 axis-group 1-Max speed	5000	
V1 axis-group 1-Initial speed	0	P
V1 axis-group 1-stop speed	0	
V1 axis-group 1-FOLLOW performance param(1-100)	50	
V1 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 positi	Quick positioning [DRVR]									
16-bit	-	32-bit	DRVR							
instruction		instruction								
Execute	Rise/fall edge of the coil	Suitable	XG1, XG2							
condition		model								
Firmware	-	Software	-							

#### 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	TD	k	$CD^*$	DX	DY	DM*	$DS^*$	K/H	ID	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
Bit	Operand				Sys	tem							
		Х	Y	M*	$S^*$	Τ*	C*	Dnm	ı				
	D0		•										
	D1		•										

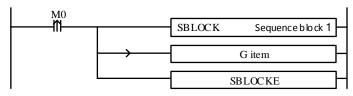
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4.	Parameter setting
----	-------------------

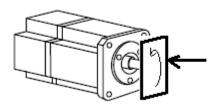
Related parameters	Setting	Note				
Final position	Must set					
Relative/absolute	Relative: the above position as a reference; absolute:	Must set				
	the origin as a reference					
Pulse output port of	Arbitrary specify pulse output point	Must set				
axis 1						
Pulse output port of	Arbitrary specify 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 Instruction									
Skip     Comment: fast position(polar)       DRVR fast position(polar)     V									
	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 interpolation [LIN]								
16-bit	-	32-bit	LIN					
instruction		instruction						
Execution	Rise/fall edge of coil	Suitable	XG1, XG2					
condition		model						
Firmware	-	Software	-					

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
S1	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	Moc	lule	
		$D^*$	D [*] FD TD [*] CD [*] DX DY DM [*]					$DS^*$	K/H	D	QD		
	S0	•	•	•		•							
	S1	٠	•	•		•							
Bit	Operand		System										
		Х	Y	M*	$S^*$	T*	C*	Dnn	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.

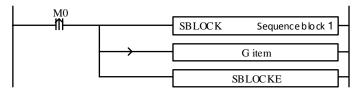
#### 4. Parameter setting

Related parameters	Setting	Note
Final position	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

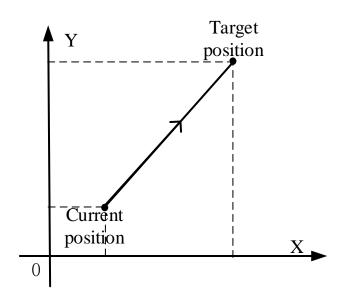
axis 1		
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 2		
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 1	parameters	
Direction port of	Arbitrarily specify idle output points, set in system	Must set
axis 2	parameters	
Pulse unit	Set in 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 Instruc	tior	า		×
Skip		Comment: line				~
		Params	_	Register	Absolute	
	<b>S0</b>	final position		DO	Absolute	
	S1	final position		D10	Absolute	
+	DO	axis 1		YO	params	
	D1	axis 2		¥1	params	
				ОК	Cancel	

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				
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				
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	e mode			
V1 axis-Common-Pulse num (1) 1					
Y1 axis-Common-1um(revolve) 1					
V1 axis-Common-Pulse direction terminal V5					
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.
- 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 (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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 interpolation [LIN]								
16-bit	-	32-bit	LIN					
instruction		instruction						
Execution	Rise/fall edge of coil	Suitable	XG1, XG2					
condition		model						
Firmware	-	Software	-					

#### 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

Nord	Operand					Syst		Constant	Mod	lule			
		$D^*$	FD	TD	)*	$CD^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	•		•							
	S1	•	٠	•		•							
	S2	•	•	•		•							
	L	•	•	•									
Bit	S2 Operand	•	•	•	Sys	• stem							
Bit	L	• X	• Y	• M*	Sys S*		C*	Dnm	1				
Bit	L				-	stem	C*	Dnm	1				

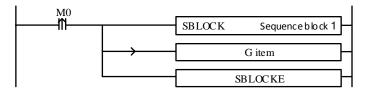
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

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

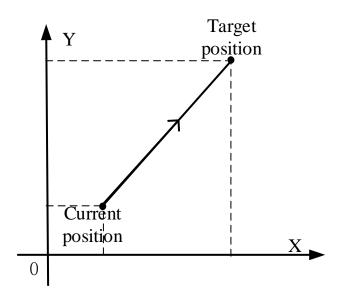
4. Parameter setting

## **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:

Skip	Comment: line VM		
LIN line VM			Ý
	Params	Register	Absolute
<b>S0</b>	final position	DO	Absolute
S1	final position	D10	Absolute
S2	max speed	D20	
• D0	axis 1	YO	params
D1	axis 2	¥1	params

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				
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			
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	e mode			
V1 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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	Linear interpolation [LIN]									
16-bit	-	32-bit	LIN							
instruction		instruction								
Execution	Rise/fall edge of coil	Suitable	XG1, XG2							
condition		model								
Firmware	-	Software	-							

2. Operand	
------------	--

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
<b>S</b> 1	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

Word	Operand						Constant	Mod	lule				
		$D^*$	FD	TI	)*	CD*	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
	S4	•	•	•		•							
	Onerand				C	tam			_				
Bit	Operand	X	Y	M*	Sys S*	tem T*	C*	Dnn	ı				
	D0		•										
	D1		•										

# 3. Suitable soft component

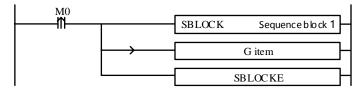
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

### 4. Parameter setting

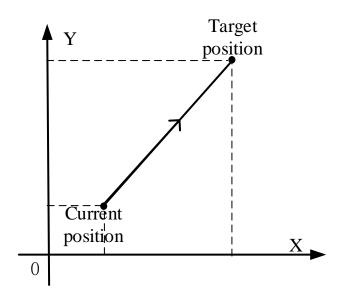
Related parameters	Setting	Note
Final position	Free to specify register address	Must set
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Start speed	Start speed at the starting point of the two axes	Must set
Stop speed	Stop speed at the end 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:

		G Ins	structi	on		5
Skip		Comment:	line VBE	M		
LIN line '	VBEM					¥
		Params		Register	Absolute	^
	<b>S0</b>	final position		DO	Absolute	
	S1	final position		D10	Absolute	
	S2	begin speed		D20		
	<b>S</b> 3	end speed		D30		
	S4	max speed		D40		
•	DO	axis 1		YO	params	
	D1	axis 2		¥1	params	¥
	51			ОК	Cance	<u> </u>

PLC1 - Pulse Set		×
Config 👻 Delete   init axis   config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive l	ogic
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 M	ode
YO axis-Common-Parameters setting-Pulse unit	1 um	
YO axis-Common-Parameters setting-Interpolation coor	Cross coor	di
YO axis-Common-pulse send mode	complete m	ode
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	incel

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)

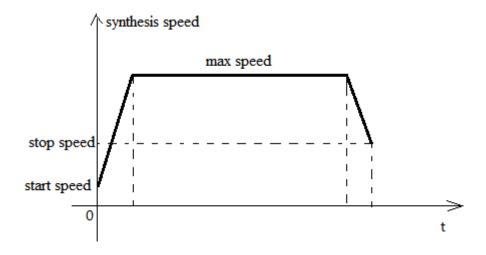
PLC1 - Pulse Set		
Config 👻 Delete   init axis   config guide		
Param SFD1036	Value	
Y1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic
Y1 axis-Common-Parameters setting-enable soft limit	disable	
Y1 axis-Common-Parameters setting-mechanical back to	negative	2
Y1 axis-Common-Parameters setting-Motor operating mo	Position	n Mode
V1 axis-Common-Parameters setting-Pulse unit	1 um	
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	
¥1 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 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 (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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:

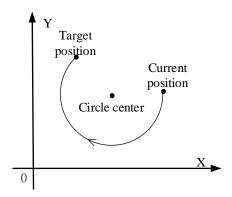


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the stop speed and maximum speed of the previous linear/arc interpolation can be set the same as the start speed and maximum speed of the next segment.

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. ٦

Clockwise a	rc interpolation [CW]		
16-bit	-	32-bit	CW
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XG1, XG2
condition		model	
Firmware	-	Software	-

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
D0	Pulse output port of axis 1	Bit
D1	Pulse output port of axis 2	Bit

Word	Operand					Syst	tem				Constant	Mod	lule
		$D^*$	FD	TL	)*	CD*	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
	Operand				Sys	stem							
Bit		Х	Y	M*	$S^*$	Τ*	C*	Dnm	ı				
	D0		•										
	D1		•										

# 3. Suitable soft component

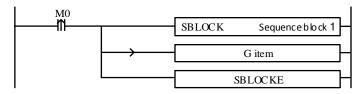
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

### 4. Parameter setting

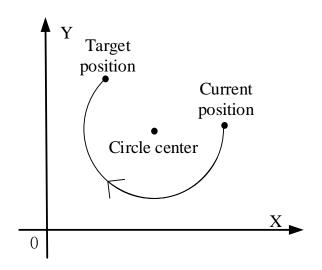
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Circle center	The position of the center is determined by the	Must 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	vice	
_ экір		Comment. Clock	wise	
CW clock	wise			×
		Params	Register	Absolute
	S0	final position	DO	Absolute
	S1	final position	D10	Absolute
	S2	center position	D20	Relative
	<b>S</b> 3	center position	D30	Relative
۱.	DO	axis 1	УО	params
	D1	axis 2	¥1	params
			ок	Cancel

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		E
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		v
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	
Y1 axis-Common-Parameters setting-mechanical back to	negative	2
Y1 axis-Common-Parameters setting-Motor operating mo	Position	n Mode
V1 axis-Common-Parameters setting-Pulse unit	1 um	
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	
¥1 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.

- 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 (XG1), 1Hz~150KHz (XG2). 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	XG1, XG2
condition		model	
Firmware	-	Software	-

2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
<b>S</b> 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
S4	Max speed of the two axes	Double words, 32-bit
D0	Pulse output port of axis 1	Bit

#### 3. Suitable soft component

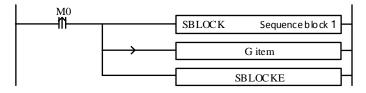
<b>X</b> 71	Operand				Constant	Module							
Word		$D^*$	FD	TI	<b>)</b> *	$CD^*$	DX	DY	DM*	$DS^*$	K/H	ID	QD
	S0	•	•	•		•							
	S1	٠	•	•		•							
	S2	٠	•	•		•							
	S3	٠	•	•		•							
	S4	•	•	•		•							
Bit	Operand		System										
		Х	Y	M*	$S^*$	Τ*	C*	Dnm	L				
	D0		•										
	D1		•										

* 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.

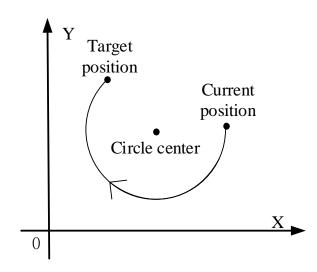
- Related parameters Setting Note Determine the end point position according to Must set Final position relative/absolute mode Relative/absolute Relative: the above position as a reference; absolute: Must set the origin as a reference Circle The position of the center is determined by the Must set center position position of the starting point and the end point Specify maximum smooth running speed of two axes Max speed 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 No need to set Default speed set in axis 1 group 2 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
- 4. Parameter setting

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: clos	ckwise VM		
W clock	kwise	VM			v
		Params	Register	Absolute	^
	<b>S0</b>	final position	DO	Absolute	
	S1	final position	D10	Absolute	
	S2	center position	D20	Relative	
	<b>S</b> 3	center position	D30	Relative	
	S4	max speed	D40		
•	DO	axis 1	YO	params	
	D1	axis 2	¥1	params	~

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 coordi	
YO axis-Common-pulse send mode	complete mode	
YO axis-Common-Pulse num (1)	1	
YO axis-Common-1um(revolve)	1	11
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	н
YO axis-group 2-Acceleration time of Pulse default s	50	Ш
YO axis-group 2-Deceleration time of pulse default s	50	Ш
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	Ш
YO axis-group 2-Max speed	100000	Ш
YO axis-group 2-Initial speed	0	н
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	
Y1 axis-Common-Parameters setting-mechanical back to	negative	2
Y1 axis-Common-Parameters setting-Motor operating mo	Position	n Mode
V1 axis-Common-Parameters setting-Pulse unit	1 um	
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	
¥1 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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 a	rc interpolation [CW]		
16-bit	-	32-bit	CW
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XG1, XG2
condition		model	
Firmware	-	Software	-

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

Wand	Operand	erand System											lule
Word		$D^*$	FD	TI	<b>)</b> *	$CD^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0~S6	٠	٠	•		•							
Bit	Operand				Sy	stem							
Βı		Х	Y	$M^*$	$\mathbf{S}^*$	Τ*	$C^*$	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.

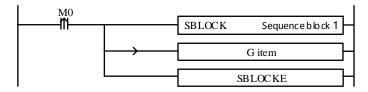
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Circle center	The position of the center is determined by the	Must 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	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

4. Parameter setting

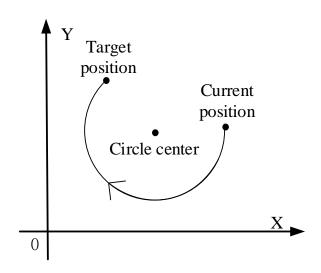
Deceleration time Set in axis 1 group 2 parameters No need to set	) set
-------------------------------------------------------------------	-------

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 Instr	ruction		
Skip		Comment: clo	ockwise VBEM		
CW clocks	wise	VBEM			Ý
		Params	Register	Absolute	• ^
	S0	final position	DO	Absolu	te
	S1	final position	D10	Absolu	te
	S2	center position	D20	Relati	ve
	S3	center position	D30	Relati	ve
	S4	begin speed	D40		
	S5	end speed	D50		
	55 56	max speed	D60		~
	00		ОК	C	ancel

	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	I

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	1um
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-1um(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)

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	
¥1 axis-Common-Parameters setting-Motor operating mo	Position	Mode
¥1 axis-Common-Parameters setting-Pulse unit	1 um	
Y1 axis-Common-Parameters setting-Interpolation coor	Cross cod	ordi
Y1 axis-Common-pulse send mode	complete	mode
Y1 axis-Common-Pulse num (1)	1	
Y1 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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.

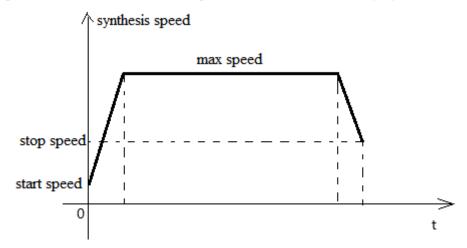
(1) When the end point is in absolute mode, the target position is (5000,2000), the center position is (3000,1500), and D20 = 2000, D30 = 500.

(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:

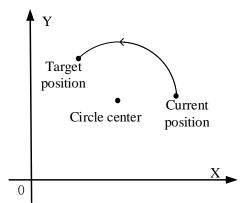


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

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.

Anticlockwise arc interpolation [CCW]							
16-bit	-	32-bit	CCW				
instruction		instruction					
Execution	Rise/fall edge of coil	Suitable	XG1, XG2				
condition		model					
Firmware	-	Software	-				

# 2. Operand

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
<b>S</b> 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	System								Constant	Module		
		$D^*$	FD	TI	)*	CD*	DX	DY	DM*	$DS^*$	K/H	ID	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
	Onema				<b>C</b>								
Bit	Operand		System										
Bit		Х	Y	M*	S*	Τ*	C*	Dnm	1				
	D0		•										
	D1		•										

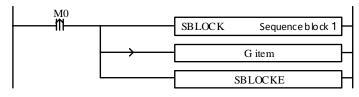
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note							
Final position	Determine the end point position according to	Must set							
	relative/absolute mode								
Relative/absolute	Relative/absolute Relative: the above position as a reference; absolute:								
	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	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							

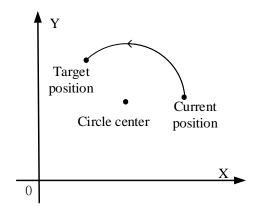
4. Parameter setting

# 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 Instruction	n		x
Skip Comr	nent: anticlockv	vise		
CCW anticlockwise			· · · · · · · · · · · · · · · · · · ·	•
Param	s	Register	Absolute	
SO final pos	ition	DO	Absolute	
S1 final pos	ition	D10	Absolute	
S2 center pos	ition	D20	Relative	
S3 center pos	ition	D30	Relative	
► DO axis	1	YO	params	
D1 axis	2	¥1	params	
		ОК	Cancel	

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	1um
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-1um(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)

Config 👻 Delete 🛛 init axis 🔤 config guide		
Param SFD1036	Value	
Y1 axis-Common-Parameters setting-Pulse direction logic	positive l	ogic
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 M	ode
V1 axis-Common-Parameters setting-Pulse unit	1 นท	
V1 axis-Common-Parameters setting-Interpolation coor	Cross coor	di
¥1 axis-Common-pulse send mode	complete m	ode
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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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.

Anticlockwise arc interpolation [CCW]							
16-bit	-	32-bit	CCW				
instruction		instruction					
Execution	Rise/fall edge of coil	Suitable	XG1, XG2				
condition		model					
Firmware	-	Software	-				

### 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					Sys	tem				Constant	Moc	lule
Word		$D^*$	FD	T	<b>D</b> *	$\mathrm{CD}^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	•		•							
	S1	•	٠	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
	S4	•	•	•		•							
Bit	Operand				Sy	stem							
		Х	Y	M*	$S^*$	T*	C*	Dnm	ı				
	D0		•										
	D1		•										

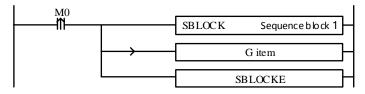
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note
Final position	Determine the end point position according to	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

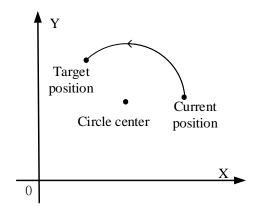
4. Parameter setting

# 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 Instruction							
Skip	Comment: antic	ockwise VM					
CCW anticlock	wise 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					
► D0	axis 1	УО	params				
D1	axis 2	¥1	params	~			
DI		ОК	Cance	1			

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	1um
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-1um(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)

Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	
V1 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	1 um	
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
V1 axis-Common-pulse send mode	complete	mode
V1 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	

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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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.

Anticlockwise arc interpolation [CCW]						
16-bit	-	32-bit	CCW			
instruction		instruction				
Execution	Rise/fall edge of coil	Suitable	XG1, XG2			
condition		model				
Firmware	-	Software	-			

# 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

Word	Operand		System									Moc	lule
Word		$D^*$	FD	TI	)*	CD*	DX	DY	DM*	$DS^*$	K/H	$\mathbb{D}$	QD
	S0~S6	•	•	•		•							
									_				
Bit	Operand				Sys	stem							
		Х	Y	$M^*$	$S^*$	Τ*	<b>C</b> *	Dn.m	ı				
	D0		•										
	D0												

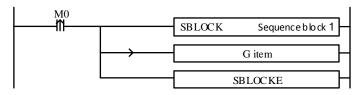
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note
Final position	Determine the end point position according to 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	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 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	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

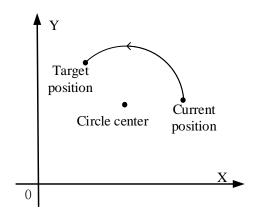
4. Parameter setting

# **Function and action**

《Instruction format》



When the CCW instruction of arc interpolation (mode 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 Instruc	tion		×
Skip	Comment: antick	ockwise VBEM		~
	Params	Register	Absolute	^
	SO final position	DO	Absolute	
	S1 final position	D10	Absolute	
	S2 center position	D20	Relative	
	S3 center position	D30	Relative	
	S4 begin speed	D40		
	S5 ^{end speed}	D50		
	S6 max speed	D60		~
		ОК	Cance	

Skip	Comment: ant	iclockwise VBEM		
CCW anti	clockwise VBEM			~
	Params	Register	Absolute	^
	center position	D30	Relative	
	begin speed	D40		
	end speed	D50		
	max speed	D60		
•	DO axis 1	ΥО	params	
	D1 axis 2	¥1	params	
	1		1	~

# Instruction configuration

PLC1 - Pulse Set			X
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	н
YO axis-group 2-Acceleration time of Pulse default s	50	Ш
YO axis-group 2-Deceleration time of pulse default s	50	Ш
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	Ш
YO axis-group 2-Max speed	100000	Ш
YO axis-group 2-Initial speed	0	н
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
¥1 axis-Common-Parameters setting-enable soft limit	disable	
V1 axis-Common-Parameters setting-mechanical back to	negative	2
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	Cross co	ordi
¥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	
¥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, 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.

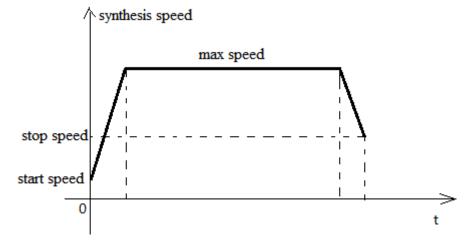
- Y0 is the pulse output port of axis 1 and Y1 is the pulse output port of axis 2. See Sections 2-3 for other optional ports.
- The directional terminals are Y4 and Y5, it is ON for the forward pulse and OFF for the reverse pulse.
- Pulse frequency range: 1Hz~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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:

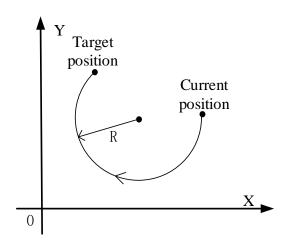


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

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	XG1, XG2
condition		model	
Firmware	-	Software	-

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

3. Suitable soft component

Word	Operand					Syst	em				Constant	Mod	lule
		$D^*$	FD	TD	)*	CD*	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•			•							
		•	System										
Bit	Operand					stem	<u> </u>					<u> </u>	
Bit		X	Y	M*	Sy:	-	C*	Dnn	1			<u> </u>	1
Bit			Y •	M*		stem	C*	Dnn	1				<u> </u>

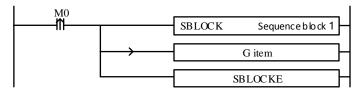
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

4. Parameter setting

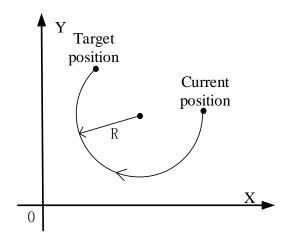
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Radius	The path of an arc varies with its radius.	Must set
Pulse 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	•		*
		Params	Register	Absolute
	<b>S0</b>	final position	DO	Absolute
	S1	final position	D10	Absolute
	S2	radius	D20	
۶.	DO	axis 1	ΥО	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)

Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD1036	Value	
11 axis-Common-Parameters setting-Pulse direction logic	positive	logic
11 axis-Common-Parameters setting-enable soft limit	disable	
11 axis-Common-Parameters setting-mechanical back to	negative	
11 axis-Common-Parameters setting Motor operating mo	Position	Mode
11 axis-Common-Parameters setting-Pulse unit	1 um	
1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
11 axis-Common-pulse send mode	complete	mode
11 axis-Common-Pulse num (1)	1	
<pre>/1 axis=Common=1um(revolve)</pre>	1	
11 axis-Common-Pulse direction terminal	¥5	
11 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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	XG1, XG2
condition		model	
Firmware	-	Software	-

### 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

Word	Operand		System									Module		
		$D^*$	FD	TI	)*	$CD^*$	DX	DY	DM*	$DS^*$	K/H	$\mathbb{D}$	QD	
	S0	•	•	•		•								
	S1	•	•	•		•								
	S2	•	•	•		•								
	S3	•	•	•		•								
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.

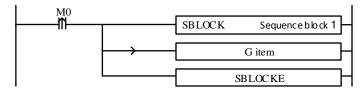
4. Parameter setting

Related parameters				Settin	g			Note
Final position	Determine	the	end	point	position	according	to	Must set

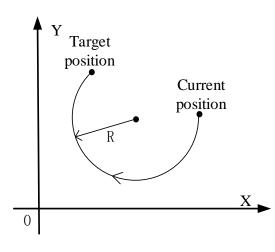
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Radius	The path of an arc varies with its radius.	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of	Arbitrary specify pulse 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 Instructio	on	×
Skip		Comment: clockwis	e VM	
CW_R d	lockwise	• VM		¥
		Params	Register	Absolute
	<b>S0</b>	final position	DO	Absolute
	S1	final position	D10	Absolute
	S2	radius	D20	
	<b>S</b> 3	max speed	D30	
•	DO	axis 1	УО	params
	D1	axis 2	¥1	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
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	1um
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-1um(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)

Config 👻 Delete 🛛 init axis 🔹 config guide		
Param SFD1036	Value	
V1 axis-Common-Parameters setting-Pulse direction logic	positive	logic
¥1 axis-Common-Parameters setting-enable soft limit	disable	
Y1 axis-Common-Parameters setting-mechanical back to	negative	2
Y1 axis-Common-Parameters setting-Motor operating mo	Positior	1 Mode
V1 axis-Common-Parameters setting-Pulse unit	1 um	
V1 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	
· ·		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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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 arc interpolation [CW_R]						
16-bit	-	32-bit	CW_R			
instruction		instruction				
Execution	Rise/fall edge of coil	Suitable	XG1, XG2			
condition		model				
Firmware	-	Software	-			

# 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		System					Constant	Mod	lule			
Word		$D^*$	FD	Т	D*	$CD^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0~S5	•	•	•		•							
Bit	Operand		System										
		Х	Y	$M^*$	$S^*$	<b>T</b> *	C*	Dnm	ı				
	D0		•										
	D1		•										

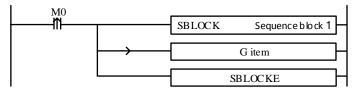
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

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
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 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

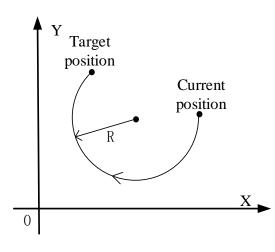
4. Parameter setting

# Function and action

《Instruction format》



When the 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 In	struc	tion		×
Skip		Comment:	clock	wise VBEM		
CW_R de	ockwis	e VBEM				~
		Params		Register	Absolute	^
	<b>S0</b>	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	~
				OK	Cance	1

Skip	Comment: c	ockwise VBEM		
CW_R d	lockwise VBEM			~
	Params	Register	Absolute	^
	radius	D20		
	begin speed	D30		
	end speed	D40		
	max speed	D50		
۱.	DO axis 1	УО	params	
	D1 axis 2	¥1	params	
				~

# Instruction configuration

PLC1 - Pulse Set			X
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	н
YO axis-group 2-Acceleration time of Pulse default s	50	Ш
YO axis-group 2-Deceleration time of pulse default s	50	Ш
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	Ш
YO axis-group 2-Max speed	100000	Ш
YO axis-group 2-Initial speed	0	н
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)

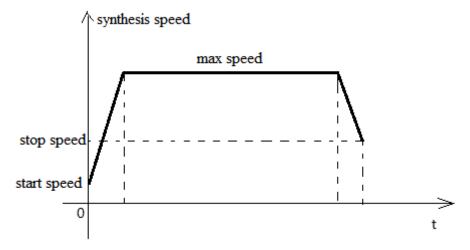
PLC1 - Pulse Set			×
Config 👻 Delete   init axis   config guide			
Param SFD1036	Value		^
V1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
¥1 axis-Common-Parameters setting-enable soft limit	disable		
V1 axis-Common-Parameters setting-mechanical back to	negative	2	
V1 axis-Common-Parameters setting Motor operating mo	Position	n Mode	
V1 axis-Common-Parameters setting-Pulse unit	1 um		
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
Y1 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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:

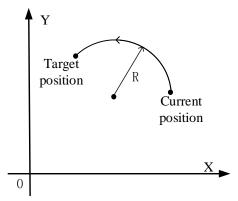


When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

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.

AIITICIOCKWI	Antelockwise are interpolation [CC w_K]						
16-bit	-	32-bit	CCW_R				
instruction		instruction					
Execution	Rise/fall edge of coil	Suitable	XG1, XG2				
condition		model					
Firmware	-	Software	-				

	• • •	FOOT	<b>D</b> 1
Anticlockwise are	e interpolation	ICCW	RT
1 11101010 01111 100 011	merperation	10011	

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

# 3. Suitable soft component

		r										r	
Word	Operand					Syst	em		-		Constant	Module	
word		$D^*$	FD	TD	)*	CD*	DX	DY	DM*	$DS^*$	K/H	ID	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
Operand System													
Bit	Operand					1							
Bit	Operand	X	Y	M*	Sys S*	stem T*	C*	Dnn	1				
Bit	Operand D0	X	Y •	M*		1	C*	Dnn	n				

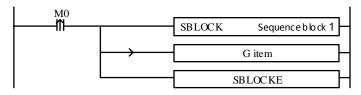
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

### 4. Parameter setting

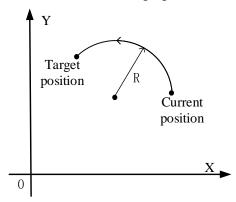
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Radius	The path of an arc varies with its radius.	Must set
Pulse 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 Instruction								
Skip		Comment: anticlo	ckwise					
CCW_R anticlockwise v								
		Params	Register	Absolute				
•	<b>S0</b>	final position	DO	Absolute				
	S1	final position	D10	Absolute				
	S2	radius	D20					
	DO	axis 1	YO	params				
	D1	axis 2	¥1	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
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	1um
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-1um(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)

Config 👻 Delete   init axis   config guide		
Param SFD1036	Value	
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	1 um	
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
Y1 axis-Common-pulse send mode	complete	e 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	

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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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.

Anticlockwise arc interpolation [CCW_R]									
16-bit	-	32-bit	CCW_R						
instruction		instruction							
Execution	Rise/fall edge of coil	Suitable	XG1, XG2						
condition		model							
Firmware	-	Software	-						

### 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

Word	Operand		System Constant Mo									dule	
		$D^*$	FD	TI	)*	$CD^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	•	•	•		•							
	S1	•	•	•		•							
	S2	•	•	•		•							
	S3	•	•	•		•							
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.

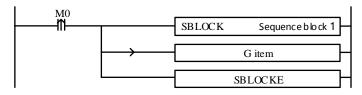
4. Parameter setting

Related parameters	Setting						Note	
Final position	Determine	the	end	point	position	according	to	Must set

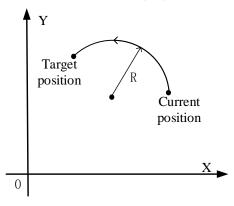
	1 . / 1 1 . 1	
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
Radius	The path of an arc varies with its radius.	Must set
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of	Arbitrary 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 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: Double-click G item and pop up the configuration panel. Set it as follows:

		G Ins	structio	on		×
Skip		Comment:	anticloc	cwise VM		
CCW_R	anticloc	kwise VM			¥	
		Params		Register	Absolute	]
+	<b>S0</b>	final position		DO	Absolute	
	S1	final position		D10	Absolute	
	S2	radius		D20		
	<b>S</b> 3	max speed		D30		
	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)

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	
Y1 axis-Common-Parameters setting-mechanical back to	negative	2
Y1 axis-Common-Parameters setting-Motor operating mo	Position	n Mode
V1 axis-Common-Parameters setting-Pulse unit	1 um	
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	
¥1 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 (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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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	se arc interpolation [CCW_R]		
16-bit	-	32-bit	CCW_R
instruction		instruction	
Execution	Rise/fall edge of coil	Suitable	XG1, XG2
condition		model	
Firmware	-	Software	-

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		System							Constant	Mod	lule	
		$D^*$	FD	TI	<b>)</b> *	CD*	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0~S5	•	•	•		•							
Bit	Operand				Sys	stem							
Bit		Х	Y	$M^*$	$S^*$	Τ*	<b>C</b> *	Dnn	ı				
	D0		•										

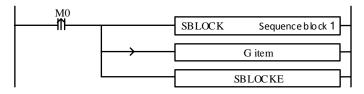
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

### 4. Parameter setting

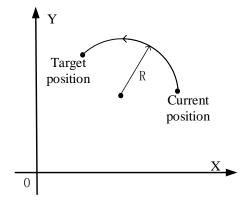
Related parameters	Setting	Note
Final position	Determine the end point position according to	Must set
	relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute:	Must set
	the origin as a reference	
radius	The radius is different and the path is different	Must set
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 In	struc	tion		×
Skip		Comment:	anticl	ockwise VBEM		
CCW_Ra	Inticioo	ckwise VBEM				~
		Params		Register	Absolute	^
	<b>S0</b>	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		YO	params	¥
				ОК	Cance	I

Skip	Comment:	antick	ockwise VBEM		
CCW_R	anticlockwise VBEM				~
	Params		Register	Absolute	^
	radius		D20		
	begin speed		D30		
	end speed		D40		
	max speed		D50		
•	DO axis 1		YO	params	
	D1 axis 2		¥1	params	
					<b>v</b>

# Instruction configuration

PLC1 - Pulse Set			X
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)

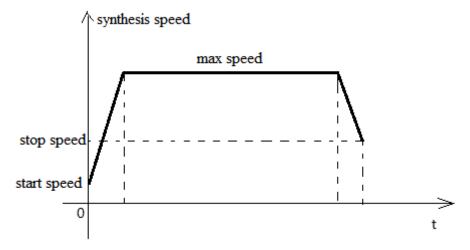
PLC1 - Pulse Set			×
Config 👻 Delete   init axis   config guide			
Param SFD1036	Value		^
V1 axis-Common-Parameters setting-Pulse direction logic	positive	e logic	
¥1 axis-Common-Parameters setting-enable soft limit	disable		
V1 axis-Common-Parameters setting-mechanical back to	negative	2	
V1 axis-Common-Parameters setting Motor operating mo	Position	n Mode	
V1 axis-Common-Parameters setting-Pulse unit	1 um		
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
Y1 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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:



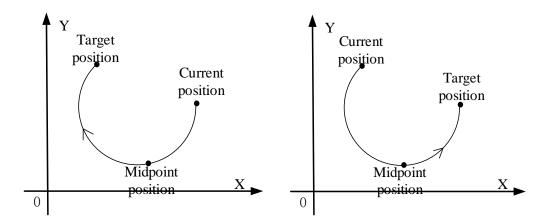
When there are multiple continuous linear/arc interpolation instructions and the speed between them needs to be constant and jump directly, the termination speed and maximum speed of the previous linear/arc interpolation can be set the same as the starting speed and maximum speed of the next segment.

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 arc interpolation [ARC]							
16-bit	-	32-bit	ARC				
instruction		instruction					
Execution	Rise/fall edge of coil	Suitable	XG1, XG2				
condition		model					
Firmware	-	Software	-				

#### 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
D1	Pulse output port of axis 2	Bit

# 3. Suitable soft component

1	Operand	and System										Module		
Word		$D^*$	FD	TL	)*	CD*	DX	DY	DM*	$DS^*$	K/H	D	QD	
	S0	•	•	•		•								
	S1	•	•	•		•								
	S2	•	•	•		•								
	S3	•	•	•		•								
	Operand		System											
Bit		Х	Y	M*	S*	T*	C*	Dn.n	n					
	D0		•											
	D1		•											

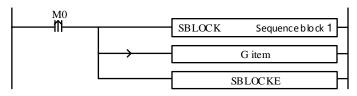
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

Related parameters	Setting	Note
Final position	Final position Determine the end point position according to relative/absolute mode	
Relative/absolute	Relative: the above position as a reference; absolute: the origin as a reference	Must set
Midpoint position	Determining the position of the midpoint of an arc according to its path	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

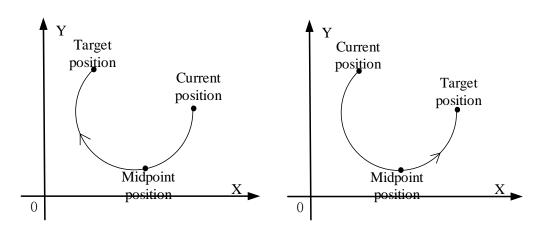
4. Parameter setting

# Function and action

《Instruction format》



When the 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										
ARC thre	e point		~							
	Params	Register	Absolute							
	SO final position	DO	Absolute							
+	S1 final position	D10	Absolute							
	S2 middle position	D20	Absolute							
	S3 middle position	D30	Absolute							
	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		$\mathbf{v}$
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	
11 axis-Common-Parameters setting-Pulse direction logic	positive	logic
11 axis-Common-Parameters setting-enable soft limit	disable	
11 axis-Common-Parameters setting-mechanical back to	negative	
11 axis-Common-Parameters setting-Motor operating mo	Position	Mode
11 axis-Common-Parameters setting-Pulse unit	1 um	
1 axis-Common-Parameters setting-Interpolation coor	Cross co	ordi
11 axis-Common-pulse send mode	complete	mode
11 axis-Common-Pulse num (1)	1	
<pre>/1 axis=Common=1um(revolve)</pre>	1	
11 axis-Common-Pulse direction terminal	¥5	
1 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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	XG1, XG2				
condition		model					
Firmware	-	Software	-				

# 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 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					Constant	Mod	lule			
		$D^*$	FD	TD	*	CD*	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0~S4	•	•	•		•							
									_				
	Operand				Sys	stem							
Bit		Х	Y	M*	$S^*$	<b>T</b> *	C*	Dn.n	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.

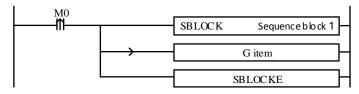
## 4. Parameter setting

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

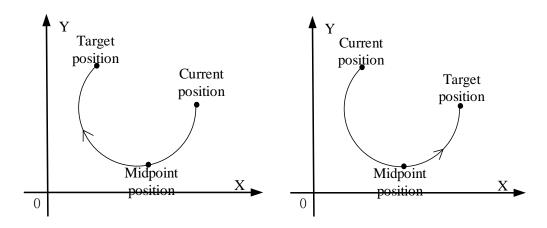
	the origin as a reference	
Midpoint position	Determining the midpoint position according to the	Must set
	arc path	
Max speed	Specify maximum smooth running speed of two axes	Must set
Pulse output port of	Arbitrary specify pulse output point	Must set
axis 1		
Pulse output port of	Arbitrary specify pulse 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 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 Instruc	tion		×
Skip	Comment: three	point VM		
ARC three point	t VM			~
	Params	Register	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	УО	params	
D1	axis 2	¥1	params	~
DI		ОК	Cance	I

### Instruction configuration

Config - Delete   init axis   config guide	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	

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		
V1 axis-Common-Parameters setting-mechanical back to	negative	2	
V1 axis-Common-Parameters setting Motor operating mo	Position	n Mode	
V1 axis-Common-Parameters setting-Pulse unit	1 um		
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
Y1 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 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~100KHz (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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	XG1, XG2				
condition		model					
Firmware	-	Software	-				

2.	Operand
	operana

Operand	Function	Туре
S0	Axis 1 target position	Double words, 32-bit
<b>S</b> 1	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	System							Constant	Mod	lule		
word		$D^*$	FD	TI	<b>)</b> *	CD*	DX	DY	DM*	$DS^*$	K/H	D	dule QD
	S0~S6	•	•	•		•							
Bit	Operand		System										
Bit		Х	Y	$M^*$	$S^*$	T*	C*	Dn.n	ı				
	D0		•										

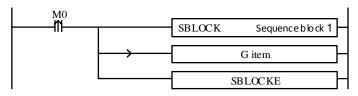
* Note: D denotes D HD; TD denotes TD HTD; CD denotes CD HCD HSCD HSD; DM denotes DM DHM; DS denotes DS DHS; M denotes M HM SM; S denotes S HS; T denotes T HT; C denotes C HC.

### 4. Parameter setting

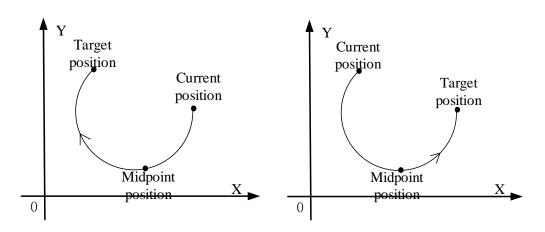
Related parameters	Setting	Note
Final position	Determine the end point position according to relative/absolute mode	Must set
Relative/absolute	Relative: the above position as a reference; absolute: the origin as a reference	Must set
Midpoint position	Determine the midpoint position according to the shape 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	e point VBEM			
ARC three point	VBEM			~	
	Params	Register	Absolute	^	
S0	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	1	

Skip	Comment: three	e point VBEM		
ARC three	point VBEM			~
	Params	Register	Absolute	^
	middle position	D30	Absolute	
	begin speed	D40		
	end speed	D50		
	max speed	D60		
▶	DO axis 1	YO	params	
	D1 axis 2	¥1	params	
			1	<b>v</b>

# Instruction configuration

PLC1 - Pulse Set		X
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	^
YO axis-Common-Parameters setting-Pulse direction logic	positive 3	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 3	Node
YO axis-Common-Parameters setting-Pulse unit	1 นท	
YO axis-Common-Parameters setting-Interpolation coor	Cross coo	rdi
YO axis-Common-pulse send mode	complete r	node
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	C	ancel

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	н
YO axis-group 2-Acceleration time of Pulse default s	50	Ш
YO axis-group 2-Deceleration time of pulse default s	50	Ш
YO axis-group 2-Acceleration and deceleration time (ms)	10	
YO axis-group 2-pulse acc/dec mode	linear acc/dec	Ш
YO axis-group 2-Max speed	100000	Ш
YO axis-group 2-Initial speed	0	н
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		
V1 axis-Common-Parameters setting-mechanical back to	negative	2	
V1 axis-Common-Parameters setting Motor operating mo	Position	n Mode	
V1 axis-Common-Parameters setting-Pulse unit	1 um		
V1 axis-Common-Parameters setting-Interpolation coor	Cross co	oordi	
Y1 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	

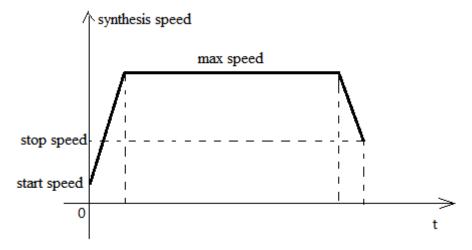
### Axis Y1 system parameters

• 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 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 (XG1), 1Hz~150KHz (XG2). Acceleration and deceleration time: 0 ~ 65535ms.
- 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	XG1, XG2				
condition		model					
Firmware	-	Software	-				

2. Operand

Operand	Function	Туре
S0	Single-phase/AB phase high speed counter	Double words, 32-bit
S1	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

Word	Operand					Syst	em				Constant	Мос	lule
		$D^*$	FD	TI	)*	$CD^*$	DX	DY	DM*	$DS^*$	K/H	D	QD
	S0	Onl	y can be High speed counter										
	S1	٠	•	•		•						•	•
	S2	•	•	•		•						•	•
	S3	•	•	•		•					•	•	•
	Operand				Sys	stem							
Bit		Х	Y	$M^*$	S*	T*	C*	Dn.m	1				
	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	System parameters corresponding to pulse output axis, the range is 1~4	Must set
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	0~100 (report error when out of range), default value is	No need to
feedforward compensation	0	set
Positive/negative limit	Hard limit can be set in system parameters of output axis	No need to set
Positive/negative value of soft limit	Soft limit can be set in system parameters of output axis	No need to set

Function and action

《Instruction format》

For single-phase incremental mode high speed counter:

For AB-phase mode high speed counter:

MO		<u>(S0</u> )	<u>(S1)</u>	<u>(S2</u> )	<b>(S3)</b>	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.
- XG supports 4 channels and can execute 4 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.

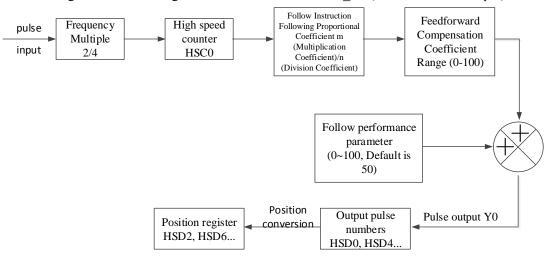
For example, after disconnecting the condition X2, a short delay is made, and the clearing instruction is executed after the time is up.

X2					
	FOLLOW	AB HS	C0 D23 I	D25 K1 Y0	Ч
					-1
X2					
	TMR	т0	K1	K100	Н
X					-1
T0					
	DN	IOV KO	HS	SC0	Ч
	20	101 110			- 1

(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

XG1 series PLC input is divided into NPN and PNP modes, and XG2 series PLC input is divided into NPN and differential modes. The internal structure and wiring mode are introduced below.

# 2-5-1-1. Input wiring

# • NPN mode

Input signal voltage	DC24V±10%
Input signal current	7mA/DC24V
Input ON current	Above 4.5mA
Input OFF current	Below 1.5mA
Input response time	About 10ms
Innut signal mode	Contact input or NPN open collector
Input signal mode	transistor
Circuit insulation	Photoelectric coupled insulation
Input action display	LED lights when input is ON

# • PNP mode

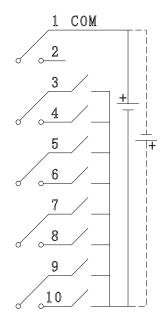
Input signal voltage	DC24V±10%			
Input signal current	7mA/DC24V			
Input ON current	Above 4.5mA			
Input OFF current	Below 1.5mA			
Input response time	About 10ms			
Turnut alian alian a da	Contact input or PNP open collector			
Input signal mode	transistor			
Circuit insulation	Photoelectric coupled insulation			
Input action display	LED lights when input is ON			

## • Differential mode

Input signal voltage	DC5V±10%
Input signal current	12mA/DC5V
Input ON current	Above 4.5mA
Input OFF current	Below 1.5mA
Input response features	Max 200Khz
Input signal mode	Differential input
Circuit insulation	Photoelectric coupled insulation
Input action display	LED lights when input is ON

### 2-5-1-2. XG1 series PLC input wiring

• XG1 series PNP, NPN wiring example



### Note:

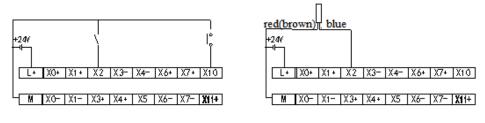
(1) In the wiring example of XG1 series PLC, the solid line is NPN type connection, and the dotted line is PNP type connection.

(2) XG1 series PLC input type must be OC signal (Collector open circuit signal).

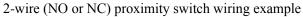
(3) XG1 series PLC is generally equipped with plug-in spring connector to facilitate wiring when leaving the factory. The length of wire peeling off is required to be 1.5cm. When wiring, press the yellow spring switch with a small screwdriver, insert the wire into the corresponding jack, and release the spring switch.

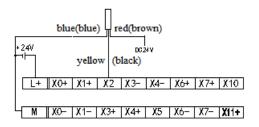
### 2-5-1-3. XG2 series PLC input wiring

### • XG2 series NPN wiring example



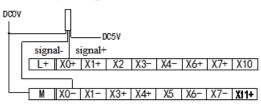
Button and switch wiring example





3-wire (NPN type) proximity switch wiring example

# • XG2 series differential wiring example



Differential wiring example

# • Terminal block and wiring cable

When wiring XG2 series PLC, special terminal blocks and connecting cables are needed. The models of terminal blocks and connecting cables are shown in the table below:

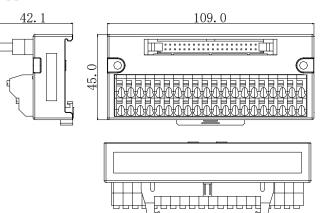
PLC model	Terminal block	Connection cable
XG2-26T4	JT-G26	JC-G26-NN05 (0.5m)
		JC-G26-NN10 (1.0m)
		JC-G26-NN15 (1.5m)

## • Terminal diagram

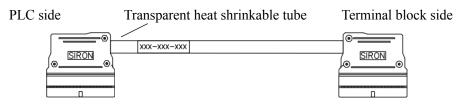
L	+	Х0+	X1+	Х2	Х3-	Х4-	Х6+	Х7+	X10	X11-	X12-	X14	X16	X20	COMO	Y1	Y3	COM1	Y5	Y7
	M	X0-	X1-	Х3+	X4+	Х5	X6-	X7-	X11+	X12+	X13	X15	X17	X21	Y0	Y2	•	Y4	Y6	•

• Terminal block appearance

### Unit: mm



# • Connection diagram



# Note:

(1) COM0 of the output end in the terminal block corresponds to Y0~Y3, and COM1 corresponds to Y4~Y7.

(2) The input type of XG2 series PLC can be OC signal (Collector open circuit signal) or DIFF signal (differential signal). Connect the signal to the corresponding collector or differential signal terminal.

(3) When connecting JT-G26, pay attention to that the terminal block requires that the length of wire stripped is 1.5cm. When wiring, press the yellow spring switch with a screwdriver, insert the wire into the corresponding jack, and release the spring switch.

(4) When connecting, please note that one end of the model wrapped by the transparent heat shrink tube is connected to the PLC, and the other end is connected to the terminal block. Do not connect it upside down!!!

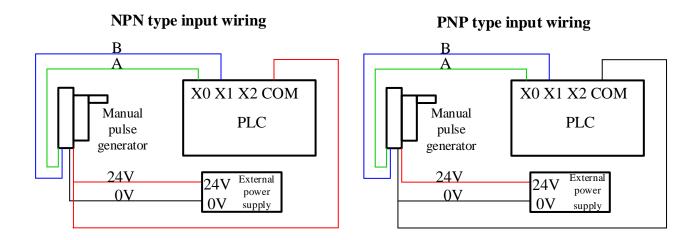
## 2-5-1-4. Hand pulse generator connection

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.

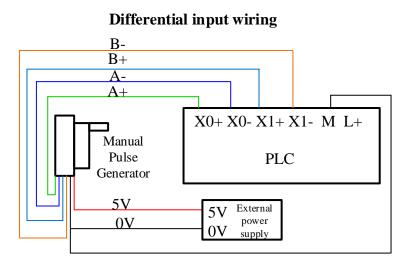


The output signal of the hand pulse generator must be OC (collector open circuit signal) DC24V type for XG1 series PLC. Generally, there will be five wires, three signal wires (A, B, Z), two power wires (24V, 0V), signal wires connected with the corresponding high-speed counting input port of the PLC. The power supply can be supplied by the output 24V of the PLC or by the switching power supply.

The following is two wiring methods:



For XG2 series PLC, the output signal of the manual pulse generator must be DIFF (differential signal) DC5V type. Generally, there are 8 wires, 6 signal wires (A+, B+, A-, B-, Z+, Z-), 2 power wires (5V, 0V). The signal wire is connected to the corresponding high-speed counting input port of PLC, and can be supplied by switching power supply. The following figure shows the wiring of differential input mode:



# 2-5-2. Output wiring

For XG 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 "XG Series PLC Hardware User Manual".

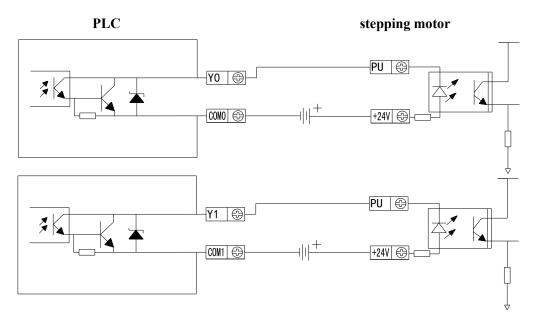
Model	XG1-16T4	XG2-26T4				
High speed pulse	Y0~Y	3				
output port						
External power supply	DC5~3	)V				
Action display	LED light					
Max current	50mA	L				
Pulse max output	100KF	Iz				
frequency						

2-5-2-1. High speed pulse output specification parameter
----------------------------------------------------------

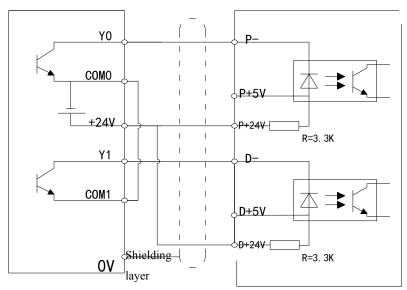
Note: PLC can output 200KHz pulses, but it can not guarantee the normal operation of all servos. Please connect about  $500 \Omega$  resistance between the output and 24V power supply.

# 2-5-2-2. 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.



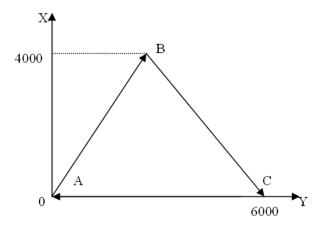
Below is the diagram of the connection between the T-type output terminal and XINJE servo motor driver.

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

Detailed hardware wiring diagram refers to "XG 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,

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 sp	eed (Hz)	1000						
	/deceleration	50						
time	(ms)							
Xa	axis	Y0-pulse; Y4-direction						
Ya	ixis	Y1-pulse; Y5-direction						

D14), the speed is 1000Hz, and the acceleration and deceleration time are 50ms. The relevant parameters are set as follows:

# Program I (absolute mode):

Add the G item in BLOCK, add three LIN instructions in it, as shown below:

		Edit Sec	uence Block 1	×
Comment:	Sequence Block	1		
Insert +	Edit Delete	Upwards Downv	vards	
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	
			ОК	Cancel

The configuration of the three instructions:

	G Instruct	ion	×
Skip	Comment: line		
LIN line			~
	Params	Register	Absolute
	final position	DO	Absolute
	final position	D10	Absolute
•	axis 1	ΥО	params
	axis 2	¥1	params
		ОК	Cancel

#### The first one $(A \rightarrow B)$

	G Instruct	ion	×
Skip	Comment: line		
LIN line			~
	Params	Register	Absolute
	final position	D2	Absolute
	final position	D12	Absolute
•	axis 1	YO	params
	axis 2	¥1	params
		ОК	Cancel

The second one  $(B \rightarrow C)$ 

	G Instructi	on	×
Skip	Comment: line		
LIN line			~
	Params	Register	Absolute
	final position	D4	Absolute
	final position	D14	Absolute
•	axis 1	УО	params
	axis 2	¥1	params
		ОК	Cancel

The third one  $(C \rightarrow A)$ 

Double click parameters, configure the Y0 axis parameters, 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	¥1	params
		ОК	Cancel

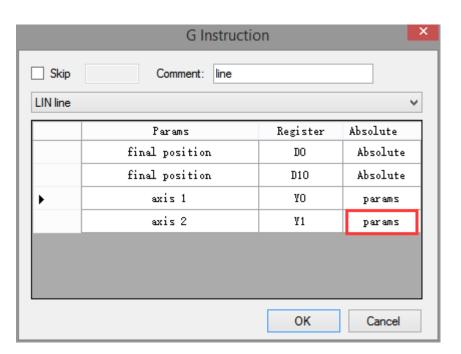
Config 🝷 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	I.
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	ľ
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
YO axis-Common-Parameters setting-Pulse unit	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	

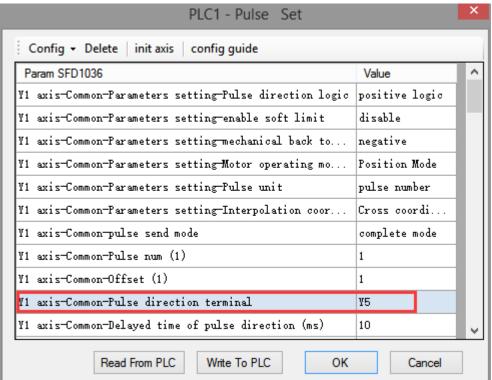
Y0 axis pulse direction terminal is set to Y4

PLC1 - Pulse Set		×
Config 🝷 Delete   init axis   config guide		
Param SFD974	Value	^
YO axis-group 1-Initial speed	0	
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
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	
Read From PLC Write To PLC OK	Ca	ancel

Y0 axis pulse default speed is set to 1000, acc/dec time is 50ms

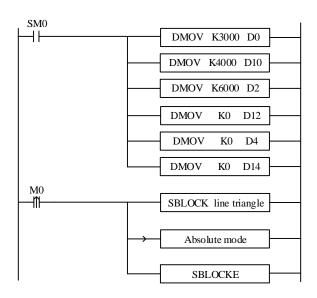
Double click parameters, configure the parameters of Y1 axis, as shown below:





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.

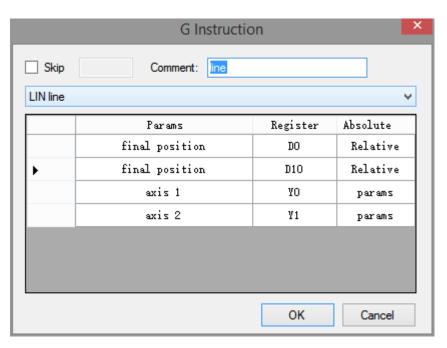


#### **Program II (relative mode):**

Three linear interpolation instructions [LIN] are added to the BLOCK by using the relative mode, as shown in the following figure:

		Edit Sequ	ience Block 1	×
	equence Block 1 dit Delete   Up	owards Downwa	rds	
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	
			ОК	Cancel

The three instructions are shown as below:



First one (A→B)

	G Instruct	tion	×
Skip	Comment: line		
LIN line			*
	Params	Register	Absolute
	final position	D2	Relative
<b>•</b>	final position	D12	Relative
	axis 1	YO	params
	axis 2	¥1	params
		ОК	Cancel

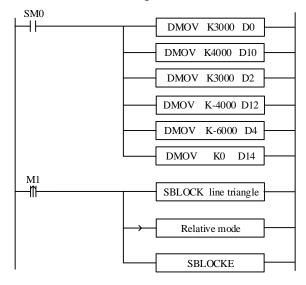
The second one  $(B \rightarrow C)$ 

	G Instructio	on	×
Skip	Comment: ine		
LIN line			*
	Params	Register	Absolute
	final position	D4	Relative
+	final position	D14	Relative
	axis 1	YO	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.



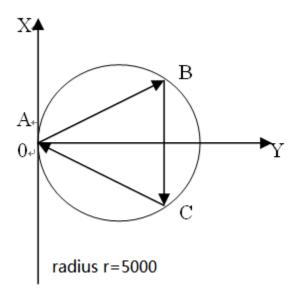
#### Note:

(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:

		Edit Sequen	ce Block 1	>
Comment:	Sequence Block1			
Insert 🗸	Edit Delete Up	wards Downwards		
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	
			OK Cance	4

The four instructions are shown as below:

truction		
clockwise VBEM		
		¥
Register	Absolute	^
DO	Absolute	
D2	Absolute	
D4	Relative	
D6	Relative	
D8		
D10		
D12		~
	Nockwise VBEM Register D0 D2 D4 D6 D8 D10	Nockwise VBEM Register Absolute D0 Absolute D2 Absolute D4 Relative D6 Relative D8 D10

Instruction ① settings (1)

	G Instruction				
Skip	Comment: cloc	kwise VBEM			
CW clocky	wise VBEM			~	
	Params	Register	Absolute	^	
•	center position	D6	Relative		
	begin speed	D8			
	end speed	D10			
	max speed	D12			
	axis 1	YO	params		
	axis 2	¥1	params		
				$\mathbf{v}$	
		ОК	Cance	I	

Instruction ① settings (2)

	G Instru	uction		
Skip	Comment: line	VBEM		
LIN line VBE	М			~
	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	¥1	params	~
		ОК	Cance	

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	УО	params		
	axis 2	¥1	params	$\sim$	
		ОК	Cance	:I	

Instruction ③ settings

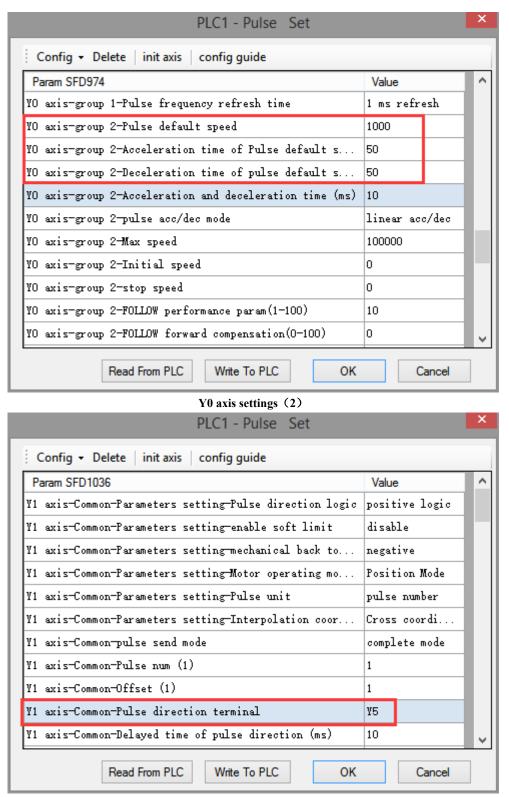
	G Instru	iction		×
Skip	Comment: line	VBEM		
LIN line VB	EM			~
	Params	Register	Absolute	^
	final position	D40	Absolute	
	final position	D42	Absolute	
	begin speed	D8		
	end speed	D10		
	max speed	D12		
•	axis 1	УО	params	
	axis 2	¥1	params	~
		ОК	Cance	1

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:

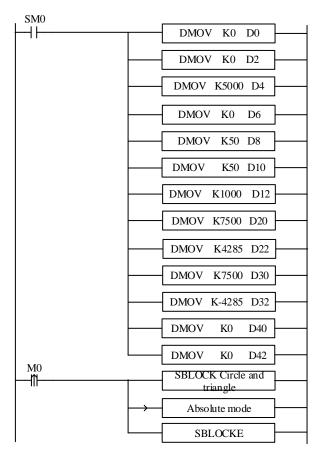
Param SFD906	Value	
YO axis-Common-Parameters setting-Pulse direction logic	positive logic	
YO axis-Common-Parameters setting-enable soft limit	disable	T
YO axis-Common-Parameters setting-mechanical back to	negative	T
YO axis-Common-Parameters setting-Motor operating mo	Position Mode	
YO axis-Common-Parameters 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	

Y0 axis settings (1)



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:

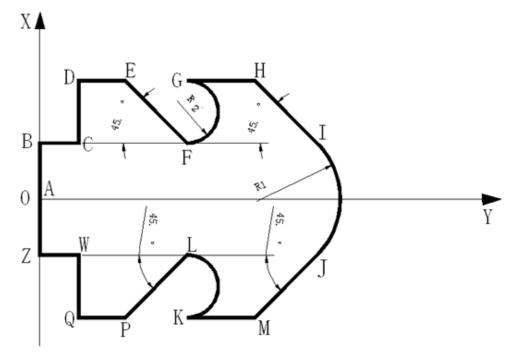
(1) The current position pulses of the two axes can be monitored by HSD2 (double word) and HSD6 (double word).

(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	1000Hz				
Acc/dec time	50ms	50ms				
X axis	Y0 pulse, Y4 direction					
Y axis	Y1 pulse, Y	75 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:

Comment: S	equence Block	1		
Insert + E	dit Delete	Upwards Downward	ls	
Index	Skip	Comment	Output	1
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 ¥0 ¥1	
7		line	LIN HD24 HD26 VO V1	11
8		line	LIN HD28 HD30 Y0 Y1	

instruction (1)  $\sim$  (8)

Comment: S	equence Block1			
Insert + E	dit Delete I	Jpwards Downwar	ds	
Index	Skip	Comment	Output	^
9		clockwise	СW_R НОЗ2 НОЗ4 НО70 УО У1	
10		line	LIN HD36 HD38 YO Y1	
11		line	LIN HD40 HD42 YO Y1	
12		anticlockwise	CCW_R HD44 HD46 HD68 YO Y1	1.
13		line	LIN HD48 HD50 Y0 Y1	
14		line	LIN HD52 HD54 YO Y1	
15		line	LIN HD56 HD58 YO Y1	
16		line	LIN HD60 HD62 YO Y1	~
			OK Can	icel
		Instruction	(9) ~ (16)	
17		line	LIN HD64 HD66 YO Y1	v
			OK Can	

instruction (17)

The endpoint position of all the above instructions must be set to "relative mode", as shown in the following figure:

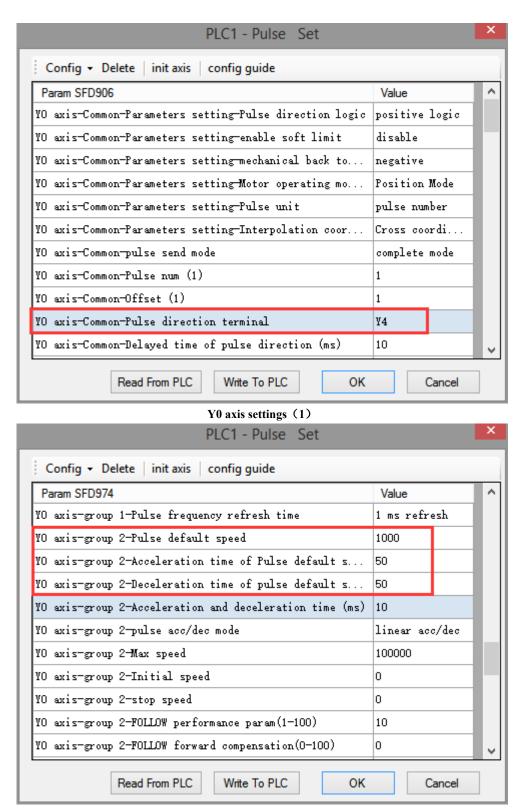
	G Instruct	ion	×
Skip	Comment: ine		
LIN line			~
	Params	Register	Absolute
	final position	но	Relative
+	final position	HD2	Relative
	axis 1	YO	params
	axis 2	¥1	params
		ОК	Cancel

	G Instruc	tion	
Skip	Comment: antiple	ockwise	
CCW_R and	ticlockwise		~
	Params	Register	Absolute
	final position	HD20	Relative
•	final position	HD22	Relative
	radius	HD68	
	axis 1	УО	params
	axis 2	Ψ1	params
		ОК	Cancel

	G Instructi	on	×
Skip	Comment: clockwi	se	
CW_R d	lockwise		¥
	Params	Register	Absolute
	final position	Ю32	Relative
•	final position	HD34	Relative
	radius	HD70	
	axis 1	YO	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:

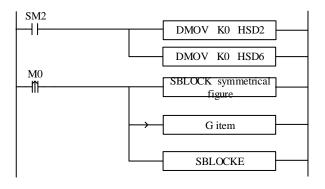


Y0 axis settings (2)

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	17
Y1 axis-Common-Parameters setting-mechanical back to	negative	L
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	
Y1 axis-Common-pulse send mode	complete mode	
Y1 axis-Common-Pulse num (1)	1	
Y1 axis-Common-Offset (1)	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	

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.



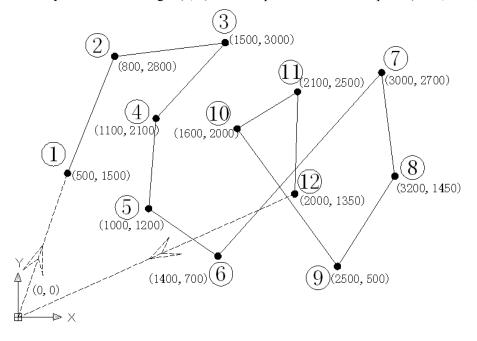
#### Note:

(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 speed (Hz)		1000		
Acc/dec time (ms)		50		
X axis		Y0-pulse; Y4-direction		
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 Sec	quence Block 1	>
Comment:	Sequence Block1			
Insert +	Edit Delete U	pwards Downv	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 YO Y1	

Instruction (1)  $\sim$  (6)

		Edit Sec	quence Block 1	×
Comment:	Sequence Block1			
	Edit Delete U	pwards Downv		
Index	Skip	Comment	Output	<u>^</u>
7		line	LIN HD24 HD26 YO Y1	
8		line	LIN HD28 HD30 YO Y1	
9		line	LIN HD32 HD34 YO Y1	
10		line	LIN HD36 HD38 YO Y1	
11		line	LIN HD40 HD42 YO Y1	
12		line	LIN HD44 HD46 YO Y1	

Instruction (7)  $\sim$  (12)

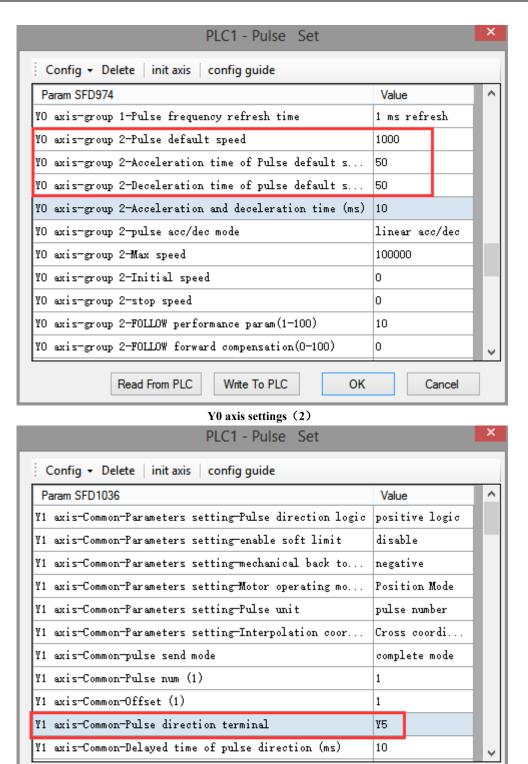
The endpoint position of all the above instructions must be set to "absolute mode", as shown in the following figure:

	G Instruc	tion	×
Skip	Comment: ine		
LIN line			*
	Params	Register	Absolute
	final position	но	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	- 12
YO axis-Common-Parameters setting-mechanical back to	negative	
YO axis-Common-Parameters setting-Motor operating mo	Position 3	lode
YO axis-Common-Parameters setting-Pulse unit	pulse numb	ber
YO axis-Common-Parameters setting-Interpolation coor	Cross coo	rdi
YO axis-Common-pulse send mode	complete n	node
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	С	ancel

Y0 axis settings (1)



Y1 axis settings (1)

Write To PLC

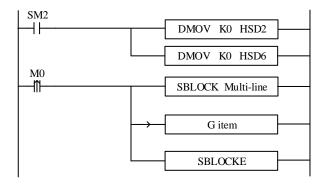
OK

Cancel

Read From PLC

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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)		
HD2 (8 words)	Reserved	0
HD10 (double words)	Pulse frequency (#1)	3000
HD12 (double word)	Pulse number (#1)	1000
HD14	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 bit7~bit0: waiting condition register type H00: constant H01: D	0

Pulse data address assignment is as follows:

	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	
	H00: constant value	
HD17	H01: D	0
	H02: HD	
	H03: FD	
HD+18 (double word)	Constant value/register no. (for jump register)(#1)	0
HD+20		000
(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		
(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
HD+30		(0.0.0
(double word)	Pulse frequency (#3)	6000
HD+32		
(double word)	Pulse number (#3)	8000
HD+34	Waiting condition, waiting condition register type (#3)	0
HD+35		
(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
X 7		1

System parameters

				<u> </u>
		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		arai
		0: not use 1: use default is 0		nete
		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	0	
SFD901	Pulse sending mode	0: complete mode 1: subsequence	0	
		mode, default is 0		-
SFD902	Pulse number/1 rotation low		0	
	16 bits			_
SFD903	Pulse number/1 rotation high		0	
	16 bits			
SFD904	Motion quantity/1 rotation		0	
	low 16 bits			
SFD905	Motion quantity/1 rotation		0	
	high 16 bits			
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 0700	compensation			
SFD909	Gear clearance negative		0	
51 0 909	compensation			
SFD910	Electrical origin low 16 bits		0	
SFD911	Electrical origin high 16 bits		0	

			-	
		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	Close point signal	Bit0~bit7: set X terminal, 0xFF is no	0xFF	
51 D 91 5	Close point signal	terminal(interruption)	UXIT	
SFD914	Z phase terminal setting	Bit0~bit7: set X terminal, 0xFF is no	0xFF	
51 D 914	Z phase terminal setting	terminal(interruption)	UXIT	
		Bit7~bit0: X terminal of positive		
SFD915	Limit terminal setting	limit, 0xFF is no terminal	FFFF	
51 D 91 5	Linni terminar setting	Bit15~bit8: X terminal of negative	1,1,1,1,	
		limit, 0xFF is no terminal		
SFD917	Clear signal CLR output	t Bit0~Bit7: Y terminal, 0xFF is no		
SFD917	terminal	terminal	0xFF	
SFD918	Returning speed VH low 16		0	
51 D 918	bits		0	
SFD919	Returning speed VH high 16		0	
SFD919	bits		0	
SFD922	Crawling speed VC low 16		0	
51 D922	bits		0	
SFD923	Crawling speed VC high 16		0	
51 D 9 2 5	bits		0	
SFD924	Mechanical origin position		0	
5FD924	low 16 bits		0	
SFD925	Mechanical origin position		0	
51 D 925	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	
SFD950	Pulse default speed low 16		1000	Gro
	bits			Group 1
		Te south and manager south default and a		$\rightarrow$
SFD951	Pulse default speed high 16 bits	It will send pulse with default speed when the speed is 0.	0	

SFD952	Pulse default speed 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	1~100, 100 means the time constant is one tick, 1 means the time constant is 100 tick.	
SFD963	Follow feedforward compensation	0~100, percentage	
•••			

## Pulse instruction:

M0	PLSR	HD0	HD100	К1	YO
SM1000	RST	MO	]		

### Software configurations:

> Pulse configuration

node: relative v		start execute section count:	0 Config			
Add Del	ete Upwards Do	ownwards				
	frequence	pulse count	wait condition	L	wai regis	jump register
1	3000	1000	pulse sending co	nplete	KO	KO
2	800	2000	pulse sending co	nplete	KO	KO
• 3	6000	8000	pulse sending co	nplete	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	~	
Read From PLC Write To PLC OK	Cancel		

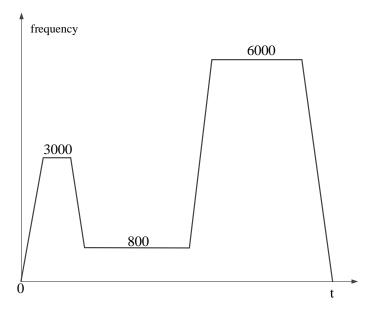
Config 👻 Delete 🛛 init axis 🔷 config guide		
Param SFD906	Value	
YO axis-Common-Gear clearance positive compensation	0	
YO axis-Common-Gear clearance negative compensation	0	
YO axis-Common-Electrical origin position	0	
YO axis-Common-signal terminal switch state setting	normally on	
YO axis-Common-signal 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	1

PLC1 - Pulse Set Config 🗸 Delete 🛛 init axis 🖉 config guide ^ Param SFD924(dword) Value 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 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

461

Config - Delete   init axis   config guide		
Param SFD963	Value	Ľ
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	I.
YO axis-group 1-Max speed	200000	
VO axis-group 1-Initial speed	0	ľ
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

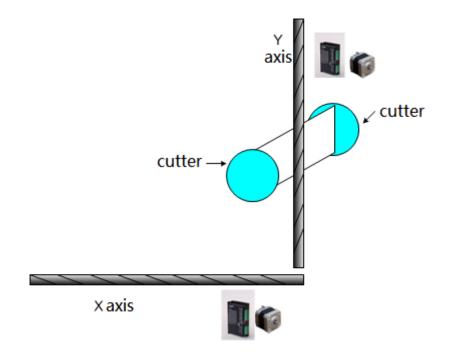
The arc saw is a machine used to cut arc boards. The mechanical characteristics are that the arc radius is large and the motor load is large.

#### 2. Products applied in this system

Product name	Model	Number
PLC	XG1-16T4	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 XG1 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

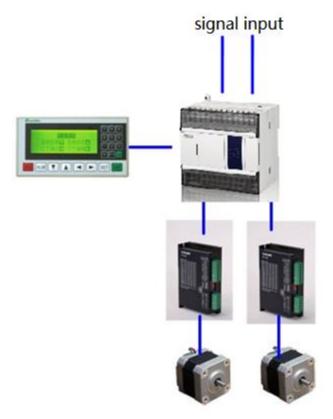
- The processing arc radius is large, the pitch of the XY axis screw is large, the number of pulse and the amount of movement are difficult to configure, if the setting is not appropriate, the data calculation is easy to overflow.
- Due to the heavy load of the motor, it is easy to lose step or overshoot.

- 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 XG PLC, which has high-speed command operation, built-in four 100KHz high-speed pulse output, support motion control command arc interpolation, RS485 and RJ45 ports, convenient for various upper computer monitoring, powerful external interrupt function, greatly saves the electrical cost for customers.

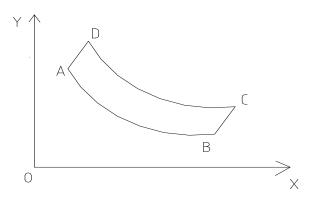
In view of the above difficulties, we adopt the method of reducing the ratio of the number of pulses and the amount of movement to reduce the calculation value and prevent the calculation overflow. (For example, the number of pulses is 2400 and the amount of movement is 10000. When setting parameters, 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	it 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

# **Appendix** Special soft element list

Appendix mainly introduces the functions of XG 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 keeps ON when       PLC running		
SM001	Coil OFF when running	SMD     SM01     keeps     OFF       SM1     when PLC running		
SM002	Initial positive pulse coil	SM2 SM02 is ON in first scan cycle		
SM003	Initial negative pulse coil	SMB        → K     SM003 is OFF in first       scan cycle     scan cycle		
SM004	PLC running error	When SM4 sets ON, it indicates that there is an error in the operation of PLC. (Firmware version V3.4.5 and above supports this function 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	$^{\underline{5ms}}$
SM012	100ms frequency cycle	$\underbrace{50ms}_{\text{K}}$
SM013	1s frequency cycle	
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	

# **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-SM113)

Address	Function	Note
SM110	HSC0 direction flag	
SM111	HSC2 direction flag	
SM112	HSC4 direction flag	
SM113	HSC6 direction flag	

# High speed counter error (SM120-SM123)

address	Function	Note
SM120	HSC0 error flag	
SM121	HSC2 error flag	
SM122	HSC4 error flag	
SM123	HSC6 error flag	

#### Communication (SM150-SM179)

	Address	Function	Note
Serial	SM150	Modbus instruction execution flag	Same to SM140
port 1	SM151		
	SM152	Free format communication sending flag	Same to SM142
	SM153	Free format communication receive complete flag	Same to SM143
	SM160	Modbus instruction execution flag	Same to SM140
Serial	SM161		
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		
	SM172	Free format communication	Same to SM142
		sending flag	
	SM173	Free format communication	Same to SM143
		receive complete flag	

# Sequence Function BLOCK (SM300-SM399)

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
SM396	BLOCK97 running flag	SM396 will be ON when block97is running
SM397	BLOCK98 running flag	SM397 will be ON when block98 is running
SM398	BLOCK99 running flag	SM398 will be ON when block99 is running
SM399	BLOCK100 running flag	SM399 will be ON when block100 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
	FOR-NEXT	
SM411	overflow	Reset when power on or users can also reset by hand.
		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-SM1070)

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	Pulse 1
	Accumulated pulse		
SM1003	equivalent overflow flag	1 is overflow	
SM1004			
SM1005			

SM1006	[]		
SM1000 SM1007			
SM1008			
SM1009			
SM1010	Pulse error flag	ON: error	
SM1020	Pulse sending flag	ON: Pulse is sending	
SM1021	Direction flag	1 is positive direction, related direction signal is ON	
	Accumulated pulse		
SM1022	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1023	equivalent overflow flag	1 is overflow	
SM1024			Pulse 2
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	5	
SM1042	number overflow flag	1 is overflow	
	Accumulated pulse		
SM1043	equivalent overflow flag	1 is overflow	
SM1044			Pulse 3
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		Pulse 4
SM1063	equivalent overflow flag	1 is overflow	
SM1063	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.		
SM1065			
SM1065			

SM1067			
SM1068			
SM1069			
SM1070	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-SD103)

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

# 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 (SD150~SD179)

ID	Function	Note
SD150	Modbus read write	0: correct
	instruction execution result	100: receive error
		101: receive overtime

	1	1	
			180: CRC error
			181: LRC error
			182: station error
			183: send buffer overflow
			400: function code error
			401: address error
			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: communication overtime
			2: memory error
			3: receive CRC error
	SD152	Free format communication	0: correct
		send result	410: free format send buffer overflow
	SD153	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
	SD154	Free format communication	In bytes, there are no start and stop
	50101	receive data numbers	characters
	•••••		
	SD159		
	SD160	Modbus read write	0: correct
	30100	instruction execution result	100: receive error
			101: receive overtime
			180: CRC error
			180. CRC error
Comin 1			
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)
1	SD161	X-Net communication result	0: correct
			1: communication overtime

			3: receive CRC error
	SD162	Free format communication	0: correct
	SD102	send result	410: free format send buffer overflow
	SD163	Free format communication	
	5D105	receive result	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
	SD164	Free format communication	In bytes, there are no start and stop
		receive data numbers	characters
	•••••		
	SD169		
Serial	SD170	Modbus read write	0: correct
port 3		instruction execution result	100: receive error
			101: receive overtime
			180: CRC error
			181: LRC error
			182: station error
			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)
	SD171	X-Net communication result	0: correct
			1: communication overtime
			2: memory error
			3: receive CRC error
	SD172	Free format communication	0: correct
		send result	410: free format send buffer overflow
	SD173	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
	SD174	Free format communication	In bytes, there are no start and stop
		receive data numbers	characters
		receive data numbers	

••••	
SD179	

# Sequence Function Block (SD300-SD399)

ID	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	Executing instruction of BLOCK5	The value will be used when BLOCK monitors
SD305	Executing instruction of BLOCK6	The value will be used when BLOCK monitors
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	

ID	Function	Explanation	Note
SD520~SD535	Extension module info	Extension module 1	Each
•••••	•••••	•••••	expansion
SD760~SD775	Extension module info	Extension module 16	module occupies 16 registers

# Module info (SD520-SD775)

# 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		

# 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-SD1070)

ID	Function	Explanation	Output point
SD1000	Present segment (segment n)		
SD1001			
SD1002	Present pulse number low 16-bit	(the unit is pulse number)	
SD1003	Present pulse number high 16-bit	(the unit is pulse number)	
SD1004	Present pulse number low 16-bit	(the unit is pulse equivalent)	
SD1005	Present pulse number high 16-bit	(the unit is pulse equivalent)	
	Present output frequency low 16-bit		Y0
SD1007	Present output frequency high 16-bit		10
SD1008		(the unit is pulse equivalent)	
SD1009	Present output frequency high 16-bit	(the unit is pulse equivalent)	
SD1010	Pulse error information	<ol> <li>pulse data segment configuration error</li> <li>In equivalent mode, the number of pulses per turn and the movement per 1 turn is 0.</li> <li>System parameter block number error</li> <li>Pulse parameter block number exceeding maximum limit</li> <li>Stop after encountering positive limit signal</li> </ol>	

SD1022Present pulse number low 16-bit(the unit is pulse number)SD1023Present pulse number high 16-bit(the unit is pulse number)SD1024Present pulse number low 16-bit(the unit is pulse equivalent)SD1025Present pulse number high 16-bit(the unit is pulse equivalent)SD1026Present output frequency low 16-bit(the unit is pulse number)SD1027Present output frequency high 16-bit(the unit is pulse number)Present output frequency high 16-bit(the unit is pulse number)			6. Stop offer meeting the persetive limit signal	
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 is 0         22: Arc interpolation data error         23: Arc ratios data error         24: Three-point Arc Data Error         25: In polar coordinate mode, the current position is         (0, 0)         26: Control block allocation failed         SD1020         Present segment         (segment n)         SD1021         Present pulse number low         (the unit is pulse number)         16-bit         SD1023         Present pulse number high         (the unit is pulse equivalent)         16-bit         SD1025         Present pulse number high         (the unit is pulse equivalent)         16-bit         SD1025         Present output frequency				
12: Origin regression crawling speed VC is 0 or VC $\geq$ VH) 13: Origin regression signal error 15: Follow Performance Parameters $\leq$ 0 or >100 16: Follow Performance Parameters $\leq$ 0 or >100 17: Follow Multiplication Coefficient and Division Coefficient Ratio $\leq$ 0 or >100 20: Interpolation Direction Terminal Not Set or Set Error 21: The default maximum interpolation speed is 0 22: Are interpolation data error 23: Are radius data error 24: Three-point Are Data Error 25: In polar coordinate mode, the current position is (0, 0) 26: Control block allocation failedSD1011 mumbererror pulse data block mumberSD1022 16-bitpresent segment (segment n)SD1024 16-bitfresent pulse number high (the unit is pulse number) 16-bitSD1025 Present pulse number high 16-bit(the unit is pulse equivalent)SD1026 Present output frequency (with 16-bit(the unit is pulse equivalent)SD1027 Present output frequency high 16-bit(the unit is pulse equivalent)SD1028 Present output frequency high 16-bit(the unit is pulse equivalent)SD1029 Present output frequency high 16-bit(the unit is pulse equivalent)SD1028 Present output frequency high 16-bit(the unit is pulse equivalent)SD1029 Present output frequency high				
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SD101       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         24: Three-point Arc Data Error         25: In polar coordinate mode, the current position is (0, 0)         26: Control block allocation failed         SD1010         Present segment (segment n)         (segment n)         SD1020         Present segment (segment n)         SD1021         SD1022         Present pulse number low (the unit is pulse number)         16-bit         SD1023         Present pulse number low (the unit is pulse equivalent)         16-bit         SD1024         Present pulse number low (the unit is pulse equivalent)         16-bit         SD1025         Present pulse number low (the unit is pulse equivalent)         16-bit         SD1025         Present pulse number low (the unit is pulse equivalent)         16-bit         SD1025         Present output frequency (w 16-bit			,	
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SD1022Present pulse number low (the unit is pulse number)(the unit is pulse number)SD1023Present pulse number high (the unit is pulse number)(the unit is pulse number)SD1024Present pulse number low (the unit is pulse equivalent)(the unit is pulse equivalent)SD1025Present pulse number high (the unit is pulse equivalent)(the unit is pulse equivalent)SD1026Present output frequency (whe unit is pulse number)(the unit is pulse number)SD1027Present output frequency high 16-bit(the unit is pulse number)SD1028Present output frequency (the unit is pulse equivalent)(the unit is pulse equivalent)SD1029Present output frequency high 16-bit(the unit is pulse equivalent)SD1029Present output frequency high 16-bit(the unit is pulse equivalent)SD1029Present output frequency high 16-bit(the unit is pulse equivalent)SD1030Pulse error informationSame to SD1010	5D1020	(segment n)		
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SD102516-bit(the unit is pulse equivalent)Y1SD1026Present output frequency low 16-bit(the unit is pulse number)Y1SD1027Present output frequency high 16-bit(the unit is pulse number)Y1SD1028Present output frequency low 16-bit(the unit is pulse number)Y1SD1029Present output frequency high 16-bit(the unit is pulse equivalent)Y1SD1029Present output frequency high 16-bit(the unit is pulse equivalent)Y1SD1030Pulse error informationSame to SD1010	SD1024	-	(the unit is pulse equivalent)	
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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				11
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	SD1026	low 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		10 11 10 010		
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	SD1027	high 16 bit	(the unit is pulse number)	
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SD1029Present output frequency high 16-bit(the unit is pulse equivalent)SD1030Pulse error informationSame to SD1010	SD1028	Present output frequency	(the unit is pulse equivalent)	
SD1030 Pulse error information Same to SD1010				
SD1030 Pulse error information Same to SD1010	SD1029	Present output frequency	(the unit is pulse equivalent)	
		8		
SD1031 error pulse data block	GD1020	Pulse error information	Same to SD1010	
	5D1050			

	number		
SD1040	Present segment (segment n)		
SD1041	(segment ii)		
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	16-bit	(the unit is pulse equivalent)	
SD1046	Present output frequency low 16-bit		Y2
	Present output frequency high 16-bit		
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 (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)	Y3
SD1065	Present pulse number high 16-bit	(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		

# 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)		- Y1
	Accumulated pulse number low 16-bit		11
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)		Y2
	Accumulated pulse number low 16-bit		12
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)		- Y3
	Accumulated pulse number high 16-bit		1.5
HSD13	(the unit is pulse number)		

	Accumulated pulse number low 16-bit	
HSD14	(the unit is pulse equivalent)	
	Accumulated pulse number high 16-bit	
HSD15	(the unit is pulse equivalent)	

# Pulse parameter group 0 (only XG1 firmware v3.5.3b and up supported)

No.	Function	Explanation
	Y0	(parameter group 0)
HSD460	Pulse default speed low 16-bit	The default speed is used to send pulses only when the
HSD461	Pulse default speed high 16-bit	speed is 0
HSD462	Acceleration time of pulse default speed	
HSD463	deceleration time of pulse default speed	
HSD464	Acceleration and deceleration time	
HSD465		Bit1~Bit0: acc/dec mode
	Pulse acc/dec mode	00: linear mode, 01: S curve mode
	Tuise acc/dec mode	10: sine curve mode, 11: reserved
		Bit15~Bit2: reserved
HSD466	Max speed	Low 16-bit
HSD467	Max speed	High 16-bit
HSD468	Initial speed	Low 16-bit
HSD469	minual speed	High 16-bit
HSD470	Stop speed	Low 16-bit
HSD471	Stop speed	High 16-bit
HSD472	Follow performance parameter	$1 \sim 100$ , 100 means that the time constant is 1 tick, and 1 means that the time constant is 100 ticks
HSD473	Follow feedforward	
	compensation	0~100, %
HSD474	Pulse frequency refresh	
	time	1ms, 0.1ms refresh
HSD476	ZRN regression velocity	Low 16-bit
HSD477	VH	High 16-bit
HSD478	ZRN crawl speed VC	Low 16-bit
HSD479		High 16-bit
	Y1	(parameter group 0)
HSD480	Pulse default speed low	The default speed is used to send pulses only when the
1150400	16-bit	speed is 0

	Pulse default speed high	
HSD481	16-bit	
HSD482	Acceleration time of pulse	
	default speed	
HSD483	deceleration time of pulse	
	default speed	
HSD484	Acceleration and	
	deceleration time	
HSD485		Bit1~Bit0: acc/dec mode
	Pulse acc/dec mode	00: linear mode, 01: S curve mode
		10: sine curve mode, 11: reserved
		Bit15~Bit2: reserved
HSD486	Max speed	Low 16-bit
HSD487	Max speed	High 16-bit
HSD488	Initial speed	Low 16-bit
HSD489		High 16-bit
HSD490	Stan anad	Low 16-bit
HSD491	Stop speed	High 16-bit
1100 402	Follow performance	$1 \sim 100$ , 100 means that the time constant is 1 tick, and 1
HSD492	parameter	means that the time constant is 100 ticks
HSD493	Follow feedforward	
	compensation	0~100, %
HSD494	Pulse frequency refresh	
	time	1ms, 0.1ms refresh
HSD496	ZRN regression velocity	Low 16-bit
HSD497	VH	High 16-bit
HSD498		Low 16-bit
HSD499	ZRN crawl speed VC	High 16-bit
	Y2	(parameter group 0)
	Pulse default speed low	
HSD500	16-bit	The default speed is used to send pulses only when the
	Pulse default speed high	speed is 0
HSD501	16-bit	
	Acceleration time of pulse	
HSD502	default speed	
HSD503	deceleration time of pulse	
	-	
HSD504	default speed Acceleration and	
HSD504	default speed	
HSD504 HSD505	default speedAccelerationand	Bit1~Bit0: acc/dec mode
	default speedAccelerationanddeceleration time	Bit1~Bit0: acc/dec mode 00: linear mode, 01: S curve mode
	default speedAccelerationand	

HSD506	Max speed	Low 16-bit	
HSD507		High 16-bit	
HSD508	Initial speed	Low 16-bit	
HSD509	initial speed	High 16-bit	
HSD510	Stop groad	Low 16-bit	
HSD511	Stop speed	High 16-bit	
1100 510	Follow performance	1~100, 100 means that the time constant is 1 tick, and 1	
HSD512	parameter	means that the time constant is 100 ticks	
HSD513	Follow feedforward		
	compensation	0~100,%	
HSD514	Pulse frequency refresh		
	time	1ms, 0.1ms refresh	
HSD516	ZRN regression velocity	Low 16-bit	
HSD517	VH	High 16-bit	
HSD517 HSD518		Low 16-bit	
HSD510 HSD519	ZRN crawl speed VC	High 16-bit	
115D517	V2	(parameter group 0)	
		(parameter group 0)	
HSD520	Pulse default speed low		
	16-bit	The default speed is used to send pulses only when the	
HSD521	Pulse default speed high	speed is 0	
	16-bit		
HSD522	Acceleration time of pulse		
	default speed		
HSD523	deceleration time of pulse		
	default speed		
HSD524	Acceleration and		
	deceleration time		
HSD525		Bit1~Bit0: acc/dec mode	
	Pulse acc/dec mode	00: linear mode, 01: S curve mode	
		10: sine curve mode, 11: reserved	
		Bit15~Bit2: reserved	
HSD526	Max speed	Low 16-bit	
HSD527	wian speed	High 16-bit	
HSD528	Initial anas d	Low 16-bit	
HSD529	Initial speed	High 16-bit	
HSD530		Low 16-bit	
HSD531	Stop speed	High 16-bit	
	Follow performance	$1 \sim 100$ , 100 means that the time constant is 1 tick, and 1	
HSD532	parameter	means that the time constant is 100 ticks	
HSD533	Follow feedforward		
	compensation	0~100, %	
HSD534	Pulse frequency refresh		
1150554	time	1ms, 0.1ms refresh	
	time	1113, 0.1113 10110511	

HSD536	ZRN regression velocity		
HSD537	VH	High 16-bit	
HSD538	ZRN crawl speed VC	Low 16-bit	
HSD539	-	High 16-bit	
	F	(parameter group 0)	
HSD540	Pulse default speed low 16-bit	The default speed is used to send pulses only when the	
HSD541	Pulse default speed high 16-bit	speed is 0	
HSD542	Acceleration time of pulse default speed		
HSD543	deceleration time of pulse default speed		
HSD544	Acceleration and deceleration time		
HSD545		Bit1~Bit0: acc/dec mode	
		00: linear mode, 01: S curve mode	
	Pulse acc/dec mode	10: sine curve mode, 11: reserved	
		Bit15~Bit2: reserved	
HSD546		Low 16-bit	
HSD547	Max speed	High 16-bit	
HSD548	T '/' 1 1	Low 16-bit	
HSD549	Initial speed	High 16-bit	
HSD550	C, 1	Low 16-bit	
HSD551	Stop speed	High 16-bit	
HSD552	Follow performance parameter	$1 \sim 100$ , 100 means that the time constant is 1 tick, and 1 means that the time constant is 100 ticks	
HSD553	Follow feedforward		
	compensation	0~100,%	
HSD554	Pulse frequency refresh		
	time	1ms, 0.1ms refresh	
HSD556	ZRN regression velocity	Low 16-bit	
HSD557	VH	High 16-bit	
HSD558		Low 16-bit	
HSD559	ZRN crawl speed VC	High 16-bit	
	Y5	(parameter group 0)	
HSD560	Pulse default speed low 16-bit	The default speed is used to send pulses only when the	
HSD561	Pulse default speed high 16-bit	speed is 0	
HSD562	Acceleration time of pulse default speed		

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HSD563	deceleration time of pulse		
	default speed		
HSD564	Acceleration and		
	deceleration time		
HSD565		Bit1~Bit0: acc/dec mode	
	Pulse acc/dec mode	00: linear mode, 01: S curve mode	
	I uise acc/dec mode	10: sine curve mode, 11: reserved	
		Bit15~Bit2: reserved	
HSD566		Low 16-bit	
HSD567	Max speed	High 16-bit	
HSD568		Low 16-bit	
HSD579	Initial speed	High 16-bit	
HSD570		Low 16-bit	
HSD570 HSD571	Stop speed	High 16-bit	
1.52071	Follow performance	$1 \sim 100$ , 100 means that the time constant is 1 tick, and 1	
HSD572	parameter	means that the time constant is 100 ticks	
HSD573	Follow feedforward		
115D575		0~100.9/	
1100574	compensation	0~100, %	
HSD574	Pulse frequency refresh		
	time	1ms, 0.1ms refresh	
HSD576	ZRN regression velocity	Low 16-bit	
HSD577	VH	High 16-bit	
HSD578	ZRN crawl speed VC	Low 16-bit	
HSD579	F	High 16-bit	
	Y6	(parameter group 0)	
HSD580	Pulse default speed low		
115D500	16-bit	The default speed is used to send pulses only when the	
HSD581	Pulse default speed high	speed is 0	
115D561	16-bit		
	Acceleration time of pulse		
HSD582	default speed		
HSD583	deceleration time of pulse		
	default speed		
HSD584	Acceleration and		
	deceleration time		
HSD585		Bit1~Bit0: acc/dec mode	
		00: linear mode, 01: S curve mode	
	Pulse acc/dec mode	10: sine curve mode, 11: reserved	
		Bit15~Bit2: reserved	
HSD586		Low 16-bit	
HSD587	Max speed	High 16-bit	
HSD587 HSD588		Low 16-bit	
HSD589	Initial speed	High 16-bit	
113D389		111gii 10-01t	

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HSD590	Stop speed	Low 16-bit
HSD591		High 16-bit
HSD592	Follow performance	$1 \sim 100$ , 100 means that the time constant is 1 tick, and 1
	parameter	means that the time constant is 100 ticks
HSD593	Follow feedforward	
	compensation	0~100, %
HSD594	Pulse frequency refresh	
	time	1ms, 0.1ms refresh
HSD596	ZRN regression velocity	Low 16-bit
HSD597	VH	High 16-bit
HSD598	ZRN crawl speed VC	Low 16-bit
HSD599	_	High 16-bit
		(parameter group 0)
HSD600	Pulse default speed low	
	16-bit	The default speed is used to send pulses only when the
HSD601	Pulse default speed high	speed is 0
	16-bit	
HSD602	Acceleration time of pulse	
	default speed	
HSD603	deceleration time of pulse	
	default speed	
HSD604	Acceleration and	
	deceleration time	
HSD605		Bit1~Bit0: acc/dec mode
	Pulse acc/dec mode	00: linear mode, 01: S curve mode
		10: sine curve mode, 11: reserved
		Bit15~Bit2: reserved
HSD606	Max speed	Low 16-bit
HSD607	1	High 16-bit
HSD608	Initial speed	Low 16-bit
HSD609		High 16-bit
HSD610	Stop speed	Low 16-bit
HSD611		High 16-bit
HSD612	Follow performance	$1\sim100$ , 100 means that the time constant is 1 tick, and 1
	parameter	means that the time constant is 100 ticks
HSD613	Follow feedforward	
	compensation	0~100, %
HSD614	Pulse frequency refresh	
	time	1ms, 0.1ms refresh
HSD616	ZRN regression velocity	Low 16-bit
HSD617	VH	High 16-bit
HSD618	ZRN crawl speed VC	Low 16-bit
HSD619		High 16-bit

	Y10 (parameter group 0)				
	Pulse default speed low				
HSD620	⁵²⁰ 16-bit The default speed is used to send pulses or				
	Pulse default speed high	speed is 0			
HSD621	16-bit				
HSD622	Acceleration time of pulse				
115D022	default speed				
HSD623	deceleration time of pulse				
	default speed				
HSD624	Acceleration and				
	deceleration time				
HSD625		Bit1~Bit0: acc/dec mode			
	Pulse acc/dec mode	00: linear mode, 01: S curve mode			
		10: sine curve mode, 11: reserved			
		Bit15~Bit2: reserved			
HSD626	Max speed	Low 16-bit			
HSD627	1	High 16-bit			
HSD628	Initial speed	Low 16-bit			
HSD629	1	High 16-bit			
HSD630	Stop speed	Low 16-bit			
HSD631		High 16-bit			
HSD632	Follow performance	$1 \sim 100$ , 100 means that the time constant is 1 tick, and 1			
	parameter	means that the time constant is 100 ticks			
HSD633	Follow feedforward				
	compensation	0~100, %			
HSD634	Pulse frequency refresh				
	time	1ms, 0.1ms refresh			
HSD636	ZRN regression velocity				
HSD637	VH	High 16-bit			
HSD638	ZRN crawl speed VC	Low 16-bit			
HSD639	371	High 16-bit			
		1 (parameter group 0)			
HSD640	Pulse default speed low	The default mood is send to send a located by the			
	16-bit Pulse default speed high	The default speed is used to send pulses only when the speed is 0			
HSD641	Pulse default speed high speed is 0 16-bit				
	Acceleration time of pulse				
HSD642	default speed				
HSD643	deceleration time of pulse				
	default speed				
HSD644	Acceleration and				
	deceleration time				

HSD645		Bit1~Bit0: acc/dec mode
	Pulse acc/dec mode	00: linear mode, 01: S curve mode
	ruise acc/dec mode	10: sine curve mode, 11: reserved
		Bit15~Bit2: reserved
HSD646	May aread	Low 16-bit
HSD647	Max speed	High 16-bit
HSD648	In this I among d	Low 16-bit
HSD649	Initial speed	High 16-bit
HSD650	Stan mar 1	Low 16-bit
HSD651	Stop speed	High 16-bit
	Follow performance	1~100, 100 means that the time constant is 1 tick, and 1
HSD652	parameter	means that the time constant is 100 ticks
HSD653	Follow feedforward	
	compensation	0~100, %
HSD654	Pulse frequency refresh	
	time	1ms, 0.1ms refresh
HSD656	ZRN regression velocity	Low 16-bit
HSD657	VH	High 16-bit
HSD658	7DN aroust groad VC	Low 16-bit
HSD659	ZRN crawl speed VC	High 16-bit

# Appendix 3. Special FLASH register list

#### Special FLASH data register SFD

* means it works only after repower on the PLC

Erasing the flash register will cause the PLC to pause. It is recommended not to execute other instructions when erasing the flash register.

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tilte	ering

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	Default value is 77 (Octonary)	
	X**		

# 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	
51 D156	100 attribute	Attribute of input terminal 0	others: negative logic
SFD139*	I01 attribute		
SFD201*	I77 attribute		

# High Speed Counting

ID	Function	Description
SFD320	HSC0 frequency times	2: 2 times frequency; 4: 4 times frequency(effective 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
SFD330	Bit selection of HSC absolute and relative (24 segment)	<ul><li>bit0 corresponds to HSC0, bit1corresponds to</li><li>HSC2, and so on, bit9 corresponds to HSC18</li><li>0: relative</li></ul>

		1: absolute
		bit0 corresponds to HSC0, bit1corresponds to
SFD331	Interrupt circulating of 24	HSC2, and so on, bit9 corresponds to HSC18
5FD551	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
SFD332	CAM function	0: do not support CAM function
		1: support CAM function

# Expansion Module Configuration

ID	Function	Explanation
SFD350	Extension module configuration	
:		Configuration of Extension Module 1
SFD359		
SFD360	Extension module configuration	
:		Configuration of Extension Module 2
SFD369		
:	:	
SFD500		
:	Extension module configuration	Configuration of Extension Module 16
SFD509		

#### Communication

ID	Function	Note
SFD600	COM1 free format communication	0: 8-bit 1: 16-bit
SFD000	buffer bit numbers	0. 8-bit 1. 10-bit
SFD610	COM2 free format communication	0: 8-bit 1: 16-bit
SFD010	buffer bit numbers	0. 8-011 1. 10-011
SFD620	COM3 free format communication	0: 8-bit 1: 16-bit
SFD020	buffer bit numbers	0. 8-bit 1. 10-bit
SFD630	COM4 free format communication	0: 8-bit 1: 16-bit
SFD050	buffer bit numbers	0. 8-bit 1. 10-bit
SFD640	COM5 free format communication	0: 8-bit 1: 16-bit
51 0040	buffer bit numbers	0. 0-01t 1. 10-01t

ID	function	Explanation
	Y0 (common ]	parameters)
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 Bit4: motor operation mode (closed loop pulse) 0: position mode 1: pulse mode, default is 0 Bit10~ Bit8: pulse unit Bit8: 0: pulse numbers, 1: equivalent 000: pulse numbers 01: micron 011: centimillimeter 101: decimillimeter 101: decimillimeter Default is 000 Bit13: pulse type 0: single direction pulse 1: AB phase pulse (only for XD5-48D4T4-E), default is 0 Bit15: interpolation coordinate mode 0: cross coordinate, 1: polar coordinate, default is 0
SFD901	Pulse sending mode	<ul><li>Bit 0: pulse sending mode</li><li>0: complete mode; 1: continue mode</li><li>Default is 0</li></ul>
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	

#### **Motion control**

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SFD912	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>
SFD913	Near-point signal terminal setting	
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	Soft limit positive value	Low 16-bit
SFD931	Soft mint positive value	High 16-bit
SFD932	Soft limit negative value	Low 16-bit
SFD933	Soft mint 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	
SFD953	deceleration time of pulse default speed	
SFD954	Accerlation and deceleration time	

		D'(1 D'(0 /1 1
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD955	Acceleration/deceleration mode	01: S curve acc/dec
		10: sine curve acc/dec
		11: reserved
GED 054		Bit15~Bit2: reserved
SFD956	Max speed low 16-bit	
SFD957	Max speed high 16-bit	
SFD958	Initial speed low 16-bit	
SFD959	Initial speed high 16-bit	
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	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SED075	A applayation (decalaration mode	01: S curve acc/dec
SFD975	Acceleration/deceleration mode	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	
app		1~100, 100 means the time constant is 1 Tick,
SFD982	Follow performance	1 means the time constant is 100 Ticks
SFD983	Follow feedforward compensation	0~100, %
	-	
	Y0 (group 3 p	parameters)
	Pulse default speed low 16-bit	
SFD990	Pulse default speed low 10-bit	Pulse is sent at the default speed when the

SFD992	Acceleration time of pulse default	
	speed	
SFD993	deceleration time of pulse default speed	
SFD994	Accerlation and deceleration time	
SFD995	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
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	
SFD1002	Follow performance	1~100, 100 means the time constant is 1 Tick, 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.
SFD1012	Acceleration time of pulse default speed	
SFD1013	deceleration time of pulse default speed	
SFD1014	Accerlation and deceleration 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 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	
SFD1022	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks

SFD1023	Follow feedforward compensation	0~100, %
	<u>^</u>	
	Y1 (common j	parameters)
SFD1030	Pulse parameters	Same to SFD900
SFD1031	Pulse sending mode	Bit 0: 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	
SFD1034	Moving amount/1 rotation low 16-bit	
SFD1035	Moving amount/1 rotation high 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 compensation	
SFD1039	Gear clearance negative compensation	
SFD1040	Electrical origin position low 16-bit	
SFD1041	Electrical origin position high 16-bit	
SFD1042	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>
SFD1044	Near-point signal terminal setting	
SFD1045	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal
SFD1047	Limit terminal setting	<ul><li>Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.</li><li>Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.</li></ul>
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	

I		
SFD1056	Mechanical origin position high 16-bit	
SFD1057	Z phase number	
SFD1058	CLR signal delay time	Default is 20, unit: ms
SFD1059	Grinding wheel radius (polar coordinates)	Low 16-bit
SFD1060	coordinates)	High 16-bit
SFD1060	Soft limit positive value	Low 16-bit
SFD1062	Soft mill positive value	High 16-bit
SFD1062	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
SFD1000	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	
SFD1085	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
SFD1086	Max speed low 16-bit	
SFD1087	Max speed high 16-bit	
	Initial speed low 16-bit	
SFD1089	Initial speed high 16-bit	
SFD1090	Stop speed low 16-bit	
SFD1091	Stop speed high 16-bit	
SFD1092	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD1093	Follow feedforward compensation	0~100, %
•••		
	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.
SFD1102	Acceleration time of pulse default speed	
	deceleration time of pulse default	
SFD1103	speed	

		D14 D10 /1 1
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1105	Acceleration/deceleration mode	01: S curve acc/dec
		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	
SED1112		1~100, 100 means the time constant is 1 Tick,
SFD1112	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.
0001100	Acceleration time of pulse default	
SFD1122	speed	
0001102	deceleration time of pulse default	
SFD1123	speed	
SFD1124	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
GED 1105	Acceleration/deceleration mode	01: S curve acc/dec
SFD1125		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	
		$1 \sim 100, 100$ means the time constant is 1 Tick,
SFD1132	Follow performance	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
SFD1140	Pulse default speed high 16-bit	speed is 0.
51 D1141	r uise deraun speed ingli 10-01	speed 15 0.

SFD1142	Acceleration time of pulse default speed	
SFD1143	deceleration time of pulse default	
0551144	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, %
	1	
	Y2 (common	parameters)
SFD1160	Pulse parameters	Same to SFD900
	1	
SFD1161	Pulse sending mode	Bit 0: pulse sending mode 0: complete mode; 1: continue mode Default is 0
SFD1161 SFD1162	Pulse sending mode Pulse number/1 rotation low 16-bit	0: complete mode; 1: continue mode
		0: complete mode; 1: continue mode
SFD1162	Pulse number/1 rotation low 16-bit	0: complete mode; 1: continue mode
SFD1162 SFD1163	Pulse number/1 rotation low 16-bit Pulse number/1 rotation high 16-bit Moving amount/1 rotation low	0: complete mode; 1: continue mode
SFD1162 SFD1163 SFD1164	Pulse number/1 rotation low 16-bit Pulse number/1 rotation high 16-bit Moving amount/1 rotation low 16-bit Moving amount/1 rotation high	0: complete mode; 1: continue mode
SFD1162 SFD1163 SFD1164 SFD1165	Pulse number/1 rotation low 16-bit Pulse number/1 rotation high 16-bit Moving amount/1 rotation low 16-bit Moving amount/1 rotation high 16-bit	0: complete mode: 1: continue mode Default is 0
SFD1162           SFD1163           SFD1164           SFD1165           SFD1166	Pulse number/1 rotation low 16-bit Pulse number/1 rotation high 16-bit Moving amount/1 rotation low 16-bit Moving amount/1 rotation high 16-bit Pulse direction terminal	0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal
SFD1162 SFD1163 SFD1164 SFD1165 SFD1166 SFD1167	Pulse number/1 rotation low 16-bitPulse number/1 rotation high 16-bitMoving amount/1 rotation low16-bitMoving amount/1 rotation high16-bitPulse direction terminalDirection delay timeGearclearancepositive	0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal
SFD1162         SFD1163         SFD1164         SFD1165         SFD1166         SFD1167         SFD1168	Pulse number/1 rotation low 16-bitPulse number/1 rotation high 16-bitMoving amount/1 rotation low16-bitMoving amount/1 rotation high16-bitPulse direction terminalDirection delay timeGear clearance positivecompensationGear clearance negative	0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal
SFD1162           SFD1163           SFD1164           SFD1165           SFD1166           SFD1167           SFD1168           SFD1169	Pulse number/1 rotation low 16-bitPulse number/1 rotation high 16-bitMoving amount/1 rotation low16-bitMoving amount/1 rotation high16-bitPulse direction terminalDirection delay timeGear clearance positivecompensationGear clearance negativecompensation	0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal

SFD1172	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>
SFD1174	Near-point signal terminal setting	
SFD1175	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal
SFD1177	Limit terminal setting	<ul><li>Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.</li><li>Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.</li></ul>
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
SFD1189	Grinding wheel radius (polar 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 01: S curve acc/dec	
01: S curve acc/dec	
01: S curve acc/dec	
SFD1215 Acceleration/deceleration mode	
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	
SFD1219 Initial speed high 16-bit	
SFD1220 Stop speed low 16-bit	
SFD1221 Stop speed high 16-bit	
SFD1222 Follow performance 1~100, 100 means the time constant is	s 1 Tick,
SFD1222Follow performanceI means the time constant is 100 Ticks	5
SFD1223 Follow feedforward compensation 0~100, %	
Y2 (group 2 parameters)	
SFD1230 Pulse default speed low 16-bit Pulse is sent at the default speed w	when the
SFD1231 Pulse default speed high 16-bit speed is 0.	
SFD1232 Acceleration time of pulse default	
speed	
SFD1233 deceleration time of pulse default	
speed	
SFD1234 Accertation and deceleration time	
Bit1~Bit0: acc/dec mode	
00: linear acc/dec	
01: S curve acc/dec	
SFD1235Acceleration/deceleration mode10: sine curve acc/dec	
11: reserved	
Bit15~Bit2: reserved	
SFD1236 Max speed low 16-bit	
SFD1237 Max speed high 16-bit	
SFD1238 Initial speed low 16-bit	
SFD1239 Initial speed high 16-bit	
SFD1240 Stop speed low 16-bit	
SFD1241 Stop speed high 16-bit	
SED1242 Follow performance 1~100, 100 means the time constant is	s 1 Tick,
SFD1242Follow performanceI means the time constant is 100 Ticks	<u> </u>
SFD1243Follow feedforward compensation0~100, %	
SFD1243     Follow feedforward compensation     0~100, %	
	when the

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	arameters)
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	
SFD1280 SFD1281	Stop speed low 16-bit Stop speed high 16-bit	

SFD1283	Follow feedforward compensation	0~100, %
	Tonow recuror ward compensation	0~100, 70
•••	Y3 (common )	narameters)
SFD1290	Pulse parameters	Same to SFD900
51 D1270		Bit 0: pulse sending mode
SFD1291	Pulse sending mode	0: complete mode; 1: continue mode
51 0 12 / 1		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	
GED 1005	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
SFD1298	Gear clearance positive	
5FD1296	compensation	
SFD1299	Gear clearance negative	
51 D1277	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
SFD1302	Signal terminal switch state	Bit2: Positive Limit Switching State Settings
	C	Bit3: Negative Limit Switching State Settings
		0: Normally open (positive logic), 1: Normally
GED 1204		closed (negative logic); default is 0
SFD1304	Near-point signal terminal setting	
SFD1305	Z phase terminal setting	Bit0~Bit7: Specify the number of the X
		terminal, 0xFF is no terminal Rit7. Rit0. Specifies the X terminal number of
		Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.
SFD1307	Limit terminal setting	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
		terminal, 0xFF is no terminal
SFD1309	Return speed VH low 16-bit	
SFD1312	Return speed VH high 16-bit	
SFD1313	Creeping speed VC low 16-bit	
SFD1314	Creeping speed VC high 16-bit	
SED1215	Mechanical origin position low	
SFD1315	16-bit	

		,
SFD1316	Mechanical origin position high 16-bit	
SFD1317	Z phase number	
SFD1318	CLR signal delay time	Default is 20, unit: ms
	Grinding wheel radius (polar	
SFD1319	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.
GED 12.42	Acceleration time of pulse default	
SFD1342	speed	
GED1242	deceleration time of pulse default	
SFD1343	speed	
SFD1344	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
CED1245		01: S curve acc/dec
SFD1345	Acceleration/deceleration mode	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	
SFD1351	Stop speed high 16-bit	
SED1252		1~100, 100 means the time constant is 1 Tick,
SFD1352	Follow performance	1 means the time constant is 100 Ticks
SFD1353	Follow feedforward compensation	0~100, %
	Y3 (group 2 p	parameters)
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.
SED1262	Acceleration time of pulse default	
SFD1362	speed	
SED12(2	deceleration time of pulse default	
SFD1363	speed	

		D'1 D'0 (1 1
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1365	Acceleration/deceleration mode	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	
0001272		1~100, 100 means the time constant is 1 Tick,
SFD1372	Follow performance	1 means the time constant is 100 Ticks
SFD1373	Follow feedforward compensation	0~100, %
	Y3 (group 3 p	parameters)
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.
	Acceleration time of pulse default	
SFD1382	speed	
GED 1202	deceleration time of pulse default	
SFD1383	speed	
SFD1384	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
0001005	/	01: S curve acc/dec
SFD1385	Acceleration/deceleration mode	10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1386	Max speed low 16-bit	
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	
	* * •	$1 \sim 100, 100$ means the time constant is 1 Tick,
SFD1392	Follow performance	1 means the time constant is 100 Ticks
SFD1393	Follow feedforward compensation	0~100, %
		· · · · · · · · · · · · · · · · · · ·
•••	Y3 (group 4 p	parameters)
SFD1400	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1400 SFD1401	Pulse default speed high 16-bit	speed is 0.
51 01401	i uise ueraun specu ingli 10-011	speed 15 0.

SFD1402	Acceleration time of pulse default speed	
	deceleration time of pulse default	
SFD1403	speed	
SFD1404	Accerlation and deceleration time	
51 D 1404		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1405	Acceleration/deceleration mode	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	$1\sim100$ , 100 means the time constant is 1 Tick,
SFD1412	Follow performance	1 means the time constant is 100 Ticks
SFD1413	Follow feedforward compensation	0~100, %
	Y4 (common )	parameters)
SFD1420	Pulse parameters	Same to SFD900
		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	
	Moving amount/1 rotation high	
SFD1425	16-bit	
SFD1426	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1420 SFD1427	Direction delay time	Default is 20, unit: ms
	Gear clearance positive	201wart 10 20, unit. 110
SFD1428	compensation	
	Gear clearance negative	
SFD1429	•	
1	compensation	
SED1420	Electrical origin resition low 16 1.1	
SFD1430 SFD1431	Electrical origin position low 16-bit Electrical origin position high 16-bit	

SFD1432	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>
SFD1434	Near-point signal terminal setting	
SFD1435	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal
SFD1437	Limit terminal setting	<ul><li>Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.</li><li>Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.</li></ul>
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
SFD1449	Grinding wheel radius (polar 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	

<u>г</u>		
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1475	Acceleration/deceleration mode	01: S curve acc/dec
51 51 775	recolution decoloration mode	10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1476	Max speed low 16-bit	
SFD1477	Max speed high 16-bit	
SFD1478	Initial speed low 16-bit	
SFD1479	Initial speed high 16-bit	
SFD1480	Stop speed low 16-bit	
SFD1481	Stop speed high 16-bit	
GED1402		1~100, 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, %
	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	
GED1402	deceleration time of pulse default	
SFD1493	speed	
SFD1494	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
655 4 4 6 <b>5</b>		01: S curve acc/dec
SFD1495	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	
		1~100, 100 means the time constant is 1 Tick,
SFD1502	Follow performance	1 means the time constant is 100 Ticks
SFD1503	Follow feedforward compensation	0~100, %
•••	L	
	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.
SI D 1011	i also actuali speca ingli 10 bit	-F*

SFD1512	Acceleration time of pulse default speed	
SFD1513	deceleration time of pulse default speed	
SFD1514	Accerlation and deceleration time	
SFD1515	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
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,

SFD1543	Follow feedforward compensation	0~100, %
	Ĩ	
	Y5 (common j	parameters)
SFD1550	Pulse parameters	Same to SFD900
SFD1551	Pulse sending mode	Bit 0: 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	
SFD1554	Moving amount/1 rotation low 16-bit	
SFD1555	Moving amount/1 rotation high 16-bit	
SFD1556	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal
SFD1557	Direction delay time	Default is 20, unit: ms
SFD1558	Gear clearance positive compensation	
SFD1559	Gear clearance negative compensation	
SFD1560	Electrical origin position low 16-bit	
SFD1561	Electrical origin position high 16-bit	
SFD1562	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>
SFD1564	Near-point signal terminal setting	
SFD1565	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal
SFD1567	Limit terminal setting	<ul><li>Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.</li><li>Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.</li></ul>
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	

SFD1576Mechanical origin position high 16-bitSFD1577Z phase numberSFD1578CLR signal delay timeSFD1578CLR signal delay timeGrinding wheel radius (polar coordinates)SFD1579Grinding wheel radius (polar coordinates)SFD1580Low 16-bitSFD1581Soft limit positive valueSFD1582High 16-bitSFD1583Soft limit negative valueLow 16-bitSFD1583Soft limit negative valueLow 16-bitSFD1600Pulse default speed low 16-bitSFD1601Pulse default speed high 16-bitSFD1602Acceleration time of pulse default speed
SFD1578     CLR signal delay time     Default is 20, unit: ms       SFD1579     Grinding wheel radius (polar 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       SFD1583     Soft limit negative value     Low 16-bit       SFD1584     Soft limit negative value     Low 16-bit       SFD1583     Soft limit negative value     Low 16-bit       SFD1584     Soft limit negative value     Low 16-bit       SFD1585     Soft limit negative value     Low 16-bit       SFD1584     Soft limit negative value     Low 16-bit       SFD1585     Soft limit negative value     Low 16-bit       SFD1584     Soft limit negative value     Low 16-bit        V5 (group 1 parameters)       SFD1600     Pulse default speed low 16-bit     Pulse is sent at the default speed when the speed is 0.       SFD1601     Pulse default speed high 16-bit     speed is 0.       SFD1602     Acceleration time of pulse default
SFD1579       Grinding wheel radius (polar 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         SFD1583       Soft limit negative value       Low 16-bit          V5 (group 1 parameters)         SFD1600       Pulse default speed low 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1602       Acceleration time of pulse default       Speed is 0.
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         SFD1583       Soft limit negative value       Low 16-bit          Low 16-bit       Low 16-bit         SFD1583       Soft limit negative value       Low 16-bit          V5 (group 1 parameters)         SFD1600       Pulse default speed low 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1601       Pulse default speed high 16-bit       speed is 0.         SFD1602       Acceleration time of pulse default       Speed is 0.
coordinates)Low 16-bitSFD1580High 16-bitSFD1581Soft limit positive valueLow 16-bitSFD1582High 16-bitSFD1583Soft limit negative valueLow 16-bit <b>Y5 (group 1 parameters)</b> SFD1600Pulse default speed low 16-bitSFD1601Pulse default speed high 16-bitSFD1602Acceleration time of pulse default
SFD1581       Soft limit positive value       Low 16-bit         SFD1582       High 16-bit         SFD1583       Soft limit negative value       Low 16-bit            Y5 (group 1 parameters)         SFD1600       Pulse default speed low 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1602       Acceleration time of pulse default       speed is 0.
SFD1582       High 16-bit         SFD1583       Soft limit negative value       Low 16-bit          V5 (group 1 parameters)         SFD1600       Pulse default speed low 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1602       Acceleration time of pulse default
SFD1583     Soft limit negative value     Low 16-bit          Y5 (group 1 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 fault
Weights     Weights       Wights     Y5 (group 1 parameters)       SFD1600     Pulse default speed low 16-bit       SFD1601     Pulse default speed high 16-bit       SFD1602     Acceleration time of pulse default
Y5 (group 1 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       For the speed is 0.
SFD1600Pulse default speed low 16-bitPulse is sent at the default speed when theSFD1601Pulse default speed high 16-bitspeed is 0.SFD1602Acceleration time of pulse default
SFD1601     Pulse default speed high 16-bit     speed is 0.       SFD1602     Acceleration time of pulse default
SFD1602 Acceleration time of pulse default
SFD1602
SFD1602 speed
deceleration time of pulse default
SFD1603 speed
SFD1604 Accertation and deceleration time
Bit1~Bit0: acc/dec mode
00: linear acc/dec
01: S curve acc/dec
SFD1605 Acceleration/deceleration mode 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
SFD1610 Stop speed low 16-bit
SFD1611 Stop speed high 16-bit
1~100, 100 means the time constant is 1 Tick,
SFD1612Follow performanceI nears the time constant is 100 Ticks
SFD1613 Follow feedforward compensation 0~100, %
•••
Y5 (group 2 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
SFD1622 speed
deceleration time of pulse default
SFD1623 speed
SFD1624 Accertation and deceleration time

		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
SFD1625	Acceleration/deceleration mode	01: S curve acc/dec
5121020		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.
	Acceleration time of pulse default	-
SFD1642	speed	
	deceleration time of pulse default	
SFD1643	speed	
SFD1644	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
	Acceleration/deceleration mode	00: linear acc/dec
		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	
		1~100, 100 means the time constant is 1 Tick,
SFD1652	Follow performance	1 means the time constant is 1 Tick,
SFD1653	Follow feedforward compensation	0~100, %
	renew recursi ward compensation	0 100, /0
•••	Y5 (group 4 p	arameters)
SFD1660	Pulse default speed low 16-bit	
		Pulse is sent at the default speed when the speed is 0
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, %
	<b>1</b>	
	Y6 (common	parameters)
SFD1680	Y6 (common ) Pulse parameters	Same to SFD900
SFD1680 SFD1681	, , , , , , , , , , , , , , , , , , ,	
	Pulse parameters	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode
SFD1681 SFD1682	Pulse parameters Pulse sending mode	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode
SFD1681 SFD1682	Pulse parameters Pulse sending mode Pulse number/1 rotation low 16-bit	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode
SFD1681 SFD1682 SFD1683	Pulse parameters         Pulse sending mode         Pulse number/1 rotation low 16-bit         Pulse number/1 rotation high 16-bit         Moving amount/1 rotation low	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode
SFD1681 SFD1682 SFD1683 SFD1684	Pulse parameters         Pulse sending mode         Pulse number/1 rotation low 16-bit         Pulse number/1 rotation high 16-bit         Moving amount/1 rotation low         16-bit         Moving amount/1 rotation high	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode
SFD1681 SFD1682 SFD1683 SFD1684 SFD1685	Pulse parameters         Pulse sending mode         Pulse number/1 rotation low 16-bit         Pulse number/1 rotation high 16-bit         Moving amount/1 rotation low         16-bit         Moving amount/1 rotation high         16-bit	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode Default is 0
SFD1681 SFD1682 SFD1683 SFD1684 SFD1685 SFD1686	Pulse parameters         Pulse sending mode         Pulse number/1 rotation low 16-bit         Pulse number/1 rotation high 16-bit         Moving amount/1 rotation low         16-bit         Moving amount/1 rotation high         16-bit         Pulse direction terminal	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal
SFD1681 SFD1682 SFD1683 SFD1684 SFD1685 SFD1685 SFD1686	Pulse parameters         Pulse sending mode         Pulse number/1 rotation low 16-bit         Pulse number/1 rotation high 16-bit         Moving amount/1 rotation low         16-bit         Moving amount/1 rotation high         16-bit         Pulse direction terminal         Direction delay time         Gear       clearance	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal
SFD1681 SFD1682 SFD1683 SFD1684 SFD1685 SFD1685 SFD1686 SFD1687 SFD1688	Pulse parameters         Pulse sending mode         Pulse number/1 rotation low 16-bit         Pulse number/1 rotation high 16-bit         Moving amount/1 rotation low         16-bit         Moving amount/1 rotation high         16-bit         Pulse direction terminal         Direction delay time         Gear       clearance         positive         compensation	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal
SFD1681         SFD1682         SFD1683         SFD1684         SFD1685         SFD1686         SFD1687         SFD1688         SFD1689	Pulse parametersPulse sending modePulse number/1 rotation low 16-bitPulse number/1 rotation high 16-bitMoving amount/1 rotation low16-bitMoving amount/1 rotation high16-bitPulse direction terminalDirection delay timeGear clearance positivecompensationGear clearance negativecompensation	Same to SFD900 Bit 0: pulse sending mode 0: complete mode; 1: continue mode Default is 0 Appoint to Y terminal, 0xFF is no terminal

SFD1692	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>
SFD1694	Near-point signal terminal setting	
SFD1695	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal
SFD1697	Limit terminal setting	<ul><li>Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.</li><li>Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.</li></ul>
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
SFD1709	Grinding wheel radius (polar 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	
	Accerlation and deceleration time	

I		D'1 D'0 (1 1
		Bit1~Bit0: acc/dec mode
SFD1735		00: linear acc/dec
	Acceleration/deceleration mode	01: S curve acc/dec
		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	Stop speed low 16-bit	
SFD1741	Stop speed high 16-bit	
CED1742		1~100, 100 means the time constant is 1 Tick,
SFD1742	Follow performance	1 means the time constant is 100 Ticks
SFD1743	Follow feedforward compensation	0~100, %
	Y6 (group 2 p	parameters)
SFD1750	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD1751	Pulse default speed high 16-bit	speed is 0.
GED1752	Acceleration time of pulse default	
SFD1752	speed	
GED1752	deceleration time of pulse default	
SFD1753	speed	
SFD1754	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
0001755	/	01: S curve acc/dec
SFD1755	Acceleration/deceleration mode	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	
	* * •	$1 \sim 100$ , 100 means the time constant is 1 Tick,
SFD1762	Follow performance	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
SFD1770	Pulse default speed high 16-bit	speed is 0.
51 D1//1	i also doluan speca ingli 10-0it	Speed 10 0.

SFD1772       speed			
SFD1773         deceleration time of pulse default speed         Bit1-Bit0: acc/dec           SFD1774         Accelation and deceleration time         Bit1-Bit0: acc/dec           SFD1775         Acceleration/deceleration mode         Bit1-Bit0: acc/dec           SFD1776         Acceleration/deceleration mode         Bit15-Bit2: reserved           SFD1776         Max speed low 16-bit         Bit15-Bit2: reserved           SFD1777         Initial speed low 16-bit         Stop speed low 16-bit           SFD1781         Initial speed high 16-bit         Stop speed low 16-bit           SFD1782         Follow performance         1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 1 Ot Ticks           SFD1782         Follow feedforward compensation         0~100, %            V6 (group 4 parameters)           SFD1790         Pulse default speed low 16-bit         Speed           SFD1791         Pulse default speed low 16-bit         Pulse is sent at the default speed when the speed is 0.           SFD1792         Acceleration time of pulse default speed is 0.         Speed           SFD1793         deceleration and deceleration time         Bit1-Bit0: acc/dec mode 00: linear acc/dec 01: scurve acc/dec 10: sine curve acc/dec 10: sine	SFD1772	Acceleration time of pulse default speed	
SFD1773       speed         SFD1774       Accerlation and deceleration time       Bit1-Bit0: acc/dec mode 00: linear acc/dec 10: S curve acc/dec 11: reserved Bit15-Bit2: reserved         SFD1776       Max speed low 16-bit       Bit15-Bit2: reserved         SFD1777       Max speed low 16-bit       Stop speed low 16-bit         SFD1778       Initial speed low 16-bit       Initial speed low 16-bit         SFD1779       Initial speed low 16-bit       Initial speed low 16-bit         SFD1778       Stop speed low 16-bit       Initial speed low 16-bit         SFD1779       Initial speed high 16-bit       Initial speed low 16-bit         SFD1780       Stop speed low 16-bit       Initial speed low 16-bit         SFD1781       Stop speed low 16-bit       Initial speed low 16-bit         SFD1782       Follow performance       In-100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks         SFD1782       Follow feedforward compensation       0-100, %          V6 (group 4 parameters)         SFD1791       Pulse default speed high 16-bit       Speed is 0.         SFD1792       Acceleration time of pulse default       speed is 0.         SFD1793       Acceleration and deceleration time       speed is 0.         SFD1794       Acceleration and deceleratin time       sp			
SFD1755Acceleration/deceleration modeBit1-Bit0: acc/dec mode 00: linear acc/dec 10: sine curve acc/dec 11: reserved Bit15-Bit2: reservedSFD1776Max speed low 16-bit	SFD1773	-	
SFD1755Acceleration/deceleration mode00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved 	SFD1774	Accerlation and deceleration time	
SFD1775     Acceleration/deceleration mode     01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15-Bit2: reserved       SFD177     Max speed low 16-bit     Bit15-Bit2: reserved       SFD177     Max speed low 16-bit     Initial speed low 16-bit       SFD1779     Initial speed low 16-bit     Initial speed low 16-bit       SFD1779     Initial speed low 16-bit     Initial speed low 16-bit       SFD1780     Stop speed low 16-bit     Initial speed low 16-bit       SFD1781     Stop speed low 16-bit     Initial speed low 16-bit       SFD1782     Follow performance     1-100, 100 means the time constant is 1 Tick, 1 means the time constant is 10 Ticks       SFD1783     Follow feedforward compensation     0-100, %			Bit1~Bit0: acc/dec mode
SFD1775     Acceleration/deceleration mode     10: sine curve acc/dec       11: reserved     Bit15Bit2: reserved       SFD1776     Max speed low 16-bit     Decemporation       SFD1777     Max speed low 16-bit     Decemporation       SFD1778     Initial speed low 16-bit     Decemporation       SFD1779     Initial speed low 16-bit     Decemporation       SFD1781     Stop speed low 16-bit     Decemporation       SFD1782     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 100 Ticks       SFD1783     Follow feedforward compensation     0-100, %        Decemporation     0-100, %        Pulse default speed low 16-bit     Pulse is sent at the default speed when the speed is 0.       SFD1790     Pulse default speed high 16-bit     speed       SFD1791     Acceleration time of pulse default speed is 0.     0: linear acc/dec       SFD1792     Acceleration ime of pulse default speed is 0.     0: linear acc/dec<			00: linear acc/dec
SFD176       Max speed low 16-bit       I1: reserved         SFD177       Max speed high 16-bit       Initial speed high 16-bit         SFD177       Initial speed high 16-bit       Initial speed high 16-bit         SFD178       Initial speed high 16-bit       Initial speed high 16-bit         SFD178       Stop speed high 16-bit       Initial speed high 16-bit         SFD1781       Stop speed high 16-bit       Initial speed high 16-bit         SFD1782       Follow performance       I-100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks         SFD1782       Follow performance       Initian speed high 16-bit         SFD1783       Follow performance       Pulse is sent at the default speed when the speed is 0.         SFD1790       Pulse default speed high 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1791       Pulse default speed high 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1792       Acceleration time of pulse default speed is 0.       Sent at the default speed is 0.         SFD1793       Acceleration and deceleration time of pulse default speed is 0.       Sent at the default speed is 0.         SFD1793       Acceleration and deceleration time of pulse default speed is 0.       Sent at the default speed is 0.         SFD1794       Acceleration ime of pulse default			01: S curve acc/dec
Image: series of the series	SFD1775	Acceleration/deceleration mode	10: sine curve acc/dec
SFD1776Max speed low 16-bitImage of high 16-bitSFD1777Initial speed high 16-bitImage of high 16-bitSFD1778Initial speed high 16-bitImage of high 16-bitSFD1780Stop speed low 16-bitImage of high 16-bitSFD1781Stop speed high 16-bitImage of high 16-bitSFD1782Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD1783Follow feedforward compensation0~100, %O0V6 (group 4 prameters)SFD1790Pulse default speed high 16-bitspeed is 0.SFD1791Pulse default speed high 16-bitspeed is 0.SFD1792Acceleration time of pulse default speed speed speed00. linear acc/decSFD1793deceleration time of pulse default speed is 0.0.00. linear acc/decSFD1794Acceleration and deceleration time00. linear acc/decSFD1795Acceleration and deceleration time01. S curve acc/dec11: reserved11: reservedBit15-Bit2: reserved11: reservedSFD1795Max speed high 16-bitImage of the speed sp			11: reserved
SFD1777Max speed high 16-bitInitial speed high 16-bitSFD1778Initial speed high 16-bit			Bit15~Bit2: reserved
SFD1777Max speed high 16-bitInitial speed high 16-bitSFD1778Initial speed high 16-bit	SFD1776	Max speed low 16-bit	
SFD1778Initial speed low 16-bitSFD1779Initial speed low 16-bitSFD1780Stop speed low 16-bitSFD1781Stop speed high 16-bitSFD1782Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD1783Follow feedforward compensation0~100, %V6 (group 4 parameters)SFD1790Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD1791Pulse default speed high 16-bitPulse is sent at the default speed when the speed is 0.SFD1792Acceleration time of pulse default speed and deceleration time of pulse default speed is 0.SFD1794Acceleration and deceleration timeSFD1795Acceleration and deceleration timeSFD1796Max speed low 16-bitSFD1797Max speed low 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed low 16-bitSFD1795Max speed low 16-bitSFD1796Max speed low 16-bitSFD1797Max speed low 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed low 16-bitSFD1791Initial speed low 16-bitSFD1792Initial speed low 16-bitSFD1793Initial speed low 16-bitSFD1794Max speed high 16-bitSFD1795Initial speed low 16-bitSFD1796Initial speed low 16-bitSFD1797Initial speed low 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed low 16-bit </td <td></td> <td></td> <td></td>			
SFD1779Initial speed high 16-bitSFD1780Stop speed low 16-bitSFD1781Stop speed high 16-bitSFD1782Follow performance1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 TicksSFD1783Follow feedforward compensation0~100, %00~100, %00SFD1790Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD1791Pulse default speed high 16-bitspeed is 0.SFD1792Acceleration time of pulse default speed is 0.SFD1793deceleration time of pulse default speed is 0.SFD1794Accerlation and deceleration timeSFD1795Acceleration ond deceleration timeSFD1796Acceleration ond deceleration timeSFD1797Acceleration hime of pulse default speed is 0.SFD1798Initial speed high 16-bitSFD1794Acceleration ondeSFD1795Max speed low 16-bitSFD1796Max speed low 16-bitSFD1797Max speed low 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1799Initial speed high 16-bitSFD1799Stop speed high 16-bitSFD1800Stop speed high 16-bit			
SFD1780Stop 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, %			
SFD1782       Follow performance       1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 1 00 Ticks         SFD1783       Follow feedforward compensation       0~100, %          0~100, %         SFD1790       Pulse default speed low 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1791       Pulse default speed high 16-bit       speed is 0.         SFD1792       Acceleration time of pulse default speed fault speed when the speed         SFD1793       deceleration time of pulse default speed of pulse default speed         SFD1794       Acceleration and deceleration time         SFD1795       Acceleration and deceleration time         SFD1796       Max speed low 16-bit         SFD1797       Max speed low 16-bit         SFD1798       Initial speed low 16-bit         SFD1799       Initial speed low 16-bit         SFD1796       Max speed low 16-bit         SFD1797       Max speed low 16-bit         SFD1798       Initial speed low 16-bit         SFD1799       Initial speed low 16-bit         SFD1790       Stop speed low 16-bit         SFD1791       Stop speed high 16-bit         SFD1792       Stop speed high 16-bit         SFD1793       Stop speed high 16-bit <td< td=""><td></td><td></td><td></td></td<>			
SFD1782Follow performance1 means the time constant is 100 TicksSFD1783Follow feedforward compensation0~100, %Y6 (group 4 parameters)SFD1790Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD1791Pulse default speed high 16-bitspeed is 0.SFD1792Acceleration time of pulse default speeddeceleration time of pulse default speedSFD1793deceleration time of pulse default speedSFD1794Accerlation and deceleration timeSFD1795Acceleration/deceleration timeSFD1796Max speed low 16-bitSine curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD1796Max speed low 16-bitSFD1797Max speed low 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed low 16-bitSFD1799Stop speed low 16-bitSFD1790Stop speed low 16-bitSFD1791Stop speed high 16-bitSFD1792Stop speed high 16-bitSFD1793Stop speed high 16-bitSFD1794Stop speed high 16-bitSFD1795Stop speed high 16-bitSFD1796Stop speed high 16-bitSFD1797Stop speed high 16-bitSFD1798Stop speed high 16-bitSFD1799Stop speed high 16-bitSFD1790Stop sp	51 51 701		$1 \sim 100$ 100 means the time constant is 1 Tick
SFD1783       Follow feedforward compensation       0~100, %          V6 (group 4 parameters)         SFD1790       Pulse default speed low 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1791       Pulse default speed high 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1792       Acceleration time of pulse default speed default speed       Pulse is sent at the default speed when the speed is 0.         SFD1793       deceleration time of pulse default speed       Send and the speed       Pulse is sent at the default speed when the speed is 0.         SFD1793       deceleration time of pulse default speed       Send and the speed       Send and the speed         SFD1794       Accerlation and deceleration time       Send and the speed       Send and the speed         SFD1794       Acceleration/deceleration mode       Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 11: reserved Bit15~Bit2: reserved         SFD1795       Max speed low 16-bit       Send and the speed low 16-bit       Send and the speed low 16-bit         SFD1798       Initial speed low 16-bit       Send and the speed low 16-bit       Send and the speed low 16-bit         SFD1799       Initial speed high 16-bit       Send and the speed low 16-bit       Send and the speed low 16-bit         SFD1800       Stop speed high 16-bit       Stop speed high 16-bi	SFD1782	Follow performance	
Y6 (group 4 parameters)         SFD1790       Pulse default speed low 16-bit       Pulse is sent at the default speed when the speed is 0.         SFD1792       Acceleration time of pulse default speed       Pulse is sent at the default speed when the speed is 0.         SFD1792       Acceleration time of pulse default speed       Pulse is sent at the default speed when the speed is 0.         SFD1793       Acceleration time of pulse default speed       Bit1-Bit0: acc/dec mode         SFD1794       Accerlation and deceleration time       Bit1-Bit0: acc/dec mode         SFD1795       Acceleration/deceleration mode       Bit1-Bit0: acc/dec mode         SFD1795       Acceleration/deceleration mode       Bit1-Sit0: acc/dec         SFD1795       Acceleration/deceleration mode       Bit1-Sit0: acc/dec         SFD1795       Max speed low 16-bit       Story acc/dec         SFD1796       Max speed high 16-bit       Story acc/dec         SFD1797       Max speed high 16-bit       Story acc/dec         SFD1798       Initial speed low 16-bit       Story speed low 16-bit         SFD1799       Initial speed low 16-bit       Stop speed low 16-bit         SFD1800       Stop speed high 16-bit       I~100, 100 means the time constant is 1 Tick,	SFD1783	Follow feedforward compensation	
Y6 (group 4 parameters)           SFD1790         Pulse default speed low 16-bit         Pulse is sent at the default speed when the speed is 0.           SFD1792         Acceleration time of pulse default speed         speed is 0.           SFD1792         Acceleration time of pulse default speed         speed           SFD1793         deceleration time of pulse default speed         speed           SFD1794         Accerlation and deceleration time         speed           SFD1795         Accerlation 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           SFD1796         Max speed low 16-bit         SFD1797           SFD1797         Max speed low 16-bit         SFD1798           SFD1798         Initial speed low 16-bit         SFD1798           SFD1796         Max speed low 16-bit         SFD1798           SFD1798         Initial speed low 16-bit         SFD1799           SFD1799         Initial speed low 16-bit         SFD1799           SFD1798         Stop speed low 16-bit         SFD1799           SFD1800         Stop speed high 16-bit         1~100, 100 means the time constant is 1 Tick,		r	
SFD1790Pulse default speed low 16-bitPulse is sent at the default speed when the speed is 0.SFD1791Pulse default speed high 16-bitspeed is 0.SFD1792Acceleration time of pulse default speedspeed is 0.SFD1793deceleration time of pulse default speedspeedSFD1794Accerlation and deceleration timespeedSFD1795Accerlation and deceleration timeBit1~Bit0: acc/dec mode 00: linear acc/decSFD1795Acceleration/deceleration mode01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD1796Max speed low 16-bitSFD1797SFD1797Max speed high 16-bitSFD1798SFD1798Initial speed high 16-bitSFD1799SFD1799Initial speed high 16-bitSFD1790SFD1794Stop speed high 16-bitSFD1790SFD1800Stop speed high 16-bitSFD1800SFD1802Follow performance1~100, 100 means the time constant is 1 Tick,		Y6 (group 4 p	parameters)
SFD1791     Pulse default speed high 16-bit     speed is 0.       SFD1792     Acceleration time of pulse default speed     speed       SFD1793     deceleration time of pulse default speed     speed       SFD1793     deceleration and deceleration time     speed       SFD1794     Accerlation and deceleration time     Bit1~Bit0: acc/dec mode 00: linear acc/dec 10: sine curve acc/dec 10: sine curve acc/dec       SFD1795     Acceleration/deceleration mode     Bit1~Bit0: acc/dec       SFD1796     Max speed low 16-bit     Bit15~Bit2: reserved       SFD1797     Max speed low 16-bit     SFD1798       SFD1798     Initial speed low 16-bit     SFD1799       SFD1799     Initial speed low 16-bit     SFD1799       SFD1799     Initial speed low 16-bit     SFD1799       SFD1790     Stop speed low 16-bit     SFD1790       SFD1799     Initial speed high 16-bit     SFD1790       SFD1799     Initial speed high 16-bit     SFD1790       SFD1790     Stop speed low 16-bit     Initial speed high 16-bit       SFD1800     Stop speed high 16-bit     Initial speed high 16-bit       SFD1801     Stop speed high 16-bit     Initial speed high 16-bit       SFD1802     Follow performance     Initial speed high 16-bit	SFD1790		,
SFD1792Acceleration time of pulse default speedImage: SpeedSFD1793deceleration time of pulse default speeddeceleration time of pulse default speedSFD1794Accerlation 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: reservedSFD1796Max speed low 16-bitESFD1797Max speed low 16-bitImage: SFD1798 Bit15~Bit2: reservedSFD1798Initial speed high 16-bitImage: Stop speed high 16-bitSFD1800Stop speed high 16-bitImage: Stop speed high 16-bitSFD1801Stop speed high 16-bitImage: Stop speed high 16-bitSFD1802Follow performance1~100, 100 means the time constant is 1 Tick,		-	
SFD1792speedSFD1793deceleration time of pulse default speedSFD1794Accerlation and deceleration timeSFD1795Accerlation and deceleration timeBit1~Bit0: acc/dec mode 00: linear acc/dec00: linear acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD1796Max speed low 16-bitSFD1797Max speed high 16-bitSFD1798Initial speed high 16-bitSFD1799Initial speed high 16-bitSFD1790Stop speed high 16-bitSFD1800Stop speed high 16-bitSFD1801Stop speed high 16-bitSFD1802Follow performanceSFD1802Follow performance			-r · · · · · · · ·
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SFD1795Bit1~Bit0: acc/dec mode 00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD1796Max speed low 16-bitSFD1797Max speed high 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1790Stop speed high 16-bitSFD1800Stop speed high 16-bitSFD1801Stop speed high 16-bitSFD1802Follow performanceSFD1802Follow performanceSFD1802Follow performance	SFD1/93	speed	
SFD1795Acceleration/deceleration mode00: linear acc/dec 01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD1796Max speed low 16-bitSFD1797Max speed high 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1790Stop speed low 16-bitSFD1800Stop speed high 16-bitSFD1801Stop speed high 16-bitSFD1802Follow performanceSFD1802Follow performance	SFD1794	Accerlation and deceleration time	
SFD1795Acceleration/deceleration mode01: S curve acc/dec 10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD1796Max speed low 16-bitBit15~Bit2: reservedSFD1797Max speed high 16-bitSFD1797SFD1798Initial speed low 16-bitSFD1798SFD1799Initial speed low 16-bitSFD1799SFD1790Stop speed low 16-bitSFD1790SFD1791Stop speed low 16-bitSFD1790SFD1800Stop speed low 16-bitSFD1801SFD1801Stop speed low 16-bitImage: Stop speed low 16-bitSFD1802Follow performance1~100, 100 means the time constant is 1 Tick,			Bit1~Bit0: acc/dec mode
SFD1795Acceleration/deceleration mode10: sine curve acc/dec 11: reserved Bit15~Bit2: reservedSFD1796Max speed low 16-bitBit15~Bit2: reservedSFD1797Max speed high 16-bitSFD1798SFD1798Initial speed low 16-bitSFD1799SFD1799Initial speed high 16-bitSFD1799SFD1800Stop speed low 16-bitSFD1800SFD1801Stop speed high 16-bit1~100, 100 means the time constant is 1 Tick,		Acceleration/deceleration mode	00: linear acc/dec
10: sine curve acc/dec11: reservedBit15~Bit2: reservedSFD1796Max speed low 16-bitSFD1797Max speed high 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1799SFD1800Stop speed low 16-bitSFD1801Stop speed high 16-bitSFD1802Follow performance1~100, 100 means the time constant is 1 Tick,	QED1705		01: S curve acc/dec
Bit15~Bit2: reservedSFD1796Max speed low 16-bitSFD1797Max speed high 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1800Stop speed low 16-bitSFD1801Stop speed high 16-bitSFD1802Follow performanceSFD1802Follow performance	SFD1/95		10: sine curve acc/dec
SFD1796Max speed low 16-bitSFD1797Max speed high 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1800Stop speed low 16-bitSFD1801Stop speed low 16-bitSFD1802Follow performance1~100, 100 means the time constant is 1 Tick,			11: reserved
SFD1797Max speed high 16-bitSFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1800Stop speed low 16-bitSFD1801Stop speed high 16-bitSFD1802Follow performance1~100, 100 means the time constant is 1 Tick,			Bit15~Bit2: reserved
SFD1798Initial speed low 16-bitSFD1799Initial speed high 16-bitSFD1800Stop speed low 16-bitSFD1801Stop speed high 16-bitSFD1802Follow performance1~100, 100 means the time constant is 1 Tick,	SFD1796	Max 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,	SFD1797	Max 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,	SFD1798	Initial speed low 16-bit	
SFD1801       Stop speed high 16-bit         SFD1802       Follow performance         1~100, 100 means the time constant is 1 Tick,	SFD1799	Initial speed high 16-bit	
SFD1801       Stop speed high 16-bit         SFD1802       Follow performance         1~100, 100 means the time constant is 1 Tick,	SFD1800	Stop speed low 16-bit	
SEDI802   Follow performance	SFD1801	Stop speed high 16-bit	
1 means the time constant is 100 Ticks	SED1902	Follow performance	1~100, 100 means the time constant is 1 Tick,
	51/01/802		1 means the time constant is 100 Ticks

SFD1803	Hollow teedtorward compensation	0~100, %	
	Follow feedforward compensation	0~100, /0	
•••	Y7 (common parameters)		
SFD1810	Pulse parameters	Same to SFD900	
SIDIOIO		Bit 0: pulse sending mode	
SFD1811	Pulse sending mode	0: complete mode; 1: continue mode	
SI DI OII		Default is 0	
SFD1812	Pulse number/1 rotation low 16-bit		
	Pulse number/1 rotation high 16-bit		
	Moving amount/1 rotation low		
SFD1814	16-bit		
	Moving amount/1 rotation high		
SFD1815	16-bit		
SFD1816	Pulse direction terminal	Appoint to Y terminal, 0xFF is no terminal	
SFD1817	Direction delay time	Default is 20, unit: ms	
SFD1818	Gear clearance positive		
SFD1818	compensation		
SFD1819	Gear clearance negative		
51 D1019	compensation		
SFD1820	Electrical origin position low 16-bit		
SFD1821	Electrical origin position high 16-bit		
		Bit0: Origin Signal Switch State Settings	
		Bit1:Z Phase Switch State Settings	
SFD1822	Signal terminal switch state	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	
SFD1824	Near-point signal terminal setting		
SFD1825	Z phase terminal setting	Bit0~Bit7: Specify the number of the X	
		terminal, 0xFF is no terminal	
		Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.	
SFD1827	Limit terminal setting	Bit15~Bit8: Specifies the X terminal number	
		of the negative limit, and 0xFF is no terminal.	
SFD1828	Zero clear CLR output signal	Bit0~Bit7: Specify the number of the Y	
51 D 1020	2010 clear CLAC output signal	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		
	Mechanical origin position low		
SFD1835			

r		[]
SFD1836	Mechanical origin position high	
<b>ADD 1007</b>	16-bit	
SFD1837	Z phase number	
SFD1838	CLR signal delay time	Default is 20, unit: ms
SFD1839	Grinding wheel radius (polar	
GED1040	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	
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
SFD1865	Acceleration/deceleration mode	01: S curve acc/dec
5121000		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD1866	Max speed low 16-bit	
SFD1867	Max speed high 16-bit	
SFD1868	Initial speed low 16-bit	
SFD1869	Initial speed high 16-bit	
SFD1870	Stop speed low 16-bit	
SFD1871	Stop speed high 16-bit	
SFD1872	Follow performance	1~100, 100 means the time constant is 1 Tick,
SFD1072	ronow benormance	
SFD1873	r r r r r r r r r r r r r r r r r r r	1 means the time constant is 100 Ticks
т — — — — — — — — — — — — — — — — — — —	Follow feedforward compensation	1 means the time constant is 100 Ticks 0~100, %
•••		
•••		0~100, %
 SFD1880	Follow feedforward compensation	0~100, %
	Follow feedforward compensation Y7 (group 2 p	0~100, %
SFD1880 SFD1881	Follow feedforward compensation Y7 (group 2 p Pulse default speed low 16-bit	0~100, % barameters) Pulse is sent at the default speed when the
SFD1880	Follow feedforward compensation <b>Y7 (group 2 p</b> Pulse default speed low 16-bit Pulse default speed high 16-bit	0~100, % barameters) Pulse is sent at the default speed when the
SFD1880 SFD1881 SFD1882	Follow feedforward compensation Y7 (group 2 p Pulse default speed low 16-bit Pulse default speed high 16-bit Acceleration time of pulse default	0~100, % barameters) Pulse is sent at the default speed when the
SFD1880 SFD1881	Follow feedforward compensation <b>Y7 (group 2 p</b> 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

		1
		Bit1~Bit0: acc/dec mode
SFD1885		00: linear acc/dec
	Acceleration/deceleration mode	01: S curve acc/dec
	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	
		$1 \sim 100$ , 100 means the time constant is 1 Tick,
SFD1892	Follow performance	1 means the time constant is 100 Ticks
SFD1893	Follow feedforward compensation	0~100, %
	1	
	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.
	Acceleration time of pulse default	- F
SFD1902	speed	
	deceleration time of pulse default	
SFD1903	speed	
SFD1904	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
	Acceleration/deceleration mode	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	
SFD1907	Initial speed low 16-bit	
SFD1900	Initial speed high 16-bit	
SFD1909	Stop speed low 16-bit	
SFD1910 SFD1911	Stop speed high 16-bit	
51 51 711	Stop speed ingh 10-on	1~100, 100 means the time constant is 1 Tick,
SFD1912	Follow performance	1 means the time constant is 100 Ticks
SFD1913	Follow feedforward compensation	0~100, %
	Tonow recuror ward compensation	0-100, /0
•••	V7 (anoun A	aramatars)
SFD1920	Y7 (group 4 p	-
	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	
51 D1724		Bit1~Bit0: acc/dec mode
SFD1925	Acceleration/deceleration 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, %
	r	
	Y10 (common	parameters)
SFD1940	Pulse parameters	Same to SFD900
SFD1941	Pulse sending mode	<ul><li>Bit 0: pulse sending mode</li><li>0: complete mode; 1: continue mode</li><li>Default is 0</li></ul>
SFD1942	Pulse number/1 rotation low 16-bit	
SFD1943	Pulse number/1 rotation high 16-bit	
SFD1944	Moving amount/1 rotation low 16-bit	
SFD1944 SFD1945	•	
	16-bit Moving amount/1 rotation high	Appoint to Y terminal, 0xFF is no terminal
SFD1945	16-bit Moving amount/1 rotation high 16-bit	Appoint to Y terminal, 0xFF is no terminal Default is 20, unit: ms
SFD1945 SFD1946	16-bitMoving amount/1 rotation high16-bitPulse direction terminal	
SFD1945 SFD1946 SFD1947	16-bitMoving amount/1 rotation high16-bitPulse direction terminalDirection delay timeGearclearancepositive	
SFD1945 SFD1946 SFD1947 SFD1948	16-bitMoving amount/1 rotation high 16-bitPulse direction terminalDirection delay timeGearclearancecompensationGearclearancenegative	
SFD1945 SFD1946 SFD1947 SFD1948 SFD1949	16-bitMoving amount/1 rotation high 16-bitPulse direction terminalDirection delay timeGearclearancecompensationGearclearancenegativecompensation	11 ,

SFD1952	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>
SFD1954	Near-point signal terminal setting	
SFD1955	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal
SFD1957	Limit terminal setting	<ul><li>Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.</li><li>Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.</li></ul>
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		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
	Acceleration/deceleration mode	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	
		1~100, 100 means the time constant is 1 Tick,
SFD2002	Follow performance	1 means the time constant is 100 Ticks
SFD2003	Follow feedforward compensation	0~100, %
	Y10 (group 2	parameters)
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.
	Acceleration time of pulse default	
SFD2012	speed	
0502012	deceleration time of pulse default	
SFD2013	speed	
SFD2014	Accerlation and deceleration time	
		Bit1~Bit0: acc/dec mode
		00: linear acc/dec
	Acceleration/deceleration mode	01: S curve acc/dec
SFD2015		10: sine curve acc/dec
		11: reserved
		Bit15~Bit2: reserved
SFD2016	Max speed low 16-bit	
SFD2017	Max speed high 16-bit	
SFD2018	Initial speed low 16-bit	
SFD2019	Initial speed high 16-bit	
SFD2020	Stop speed low 16-bit	
SFD2021	Stop speed high 16-bit	
		1~100, 100 means the time constant is 1 Tick,
SFD2022	Follow performance	1 means the time constant is 100 Ticks
SFD2023	Follow feedforward compensation	0~100, %
•••	r r r r r r r r r r r r r r r r r r r	
	Y10 (group 3	parameters)
SFD2030	Pulse default speed low 16-bit	Pulse is sent at the default speed when the
SFD2030	Pulse default speed high 16-bit	speed is 0.
SFD2031	ruise detaun speed nigh 16-bit	speed is 0.

	Acceleration time of pulse default	
SFD2032	speed	
SFD2033	deceleration time of pulse default speed	
SFD2034	Accerlation and deceleration time	
SFD2035	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
SFD2036	Max speed low 16-bit	
SFD2037	Max speed high 16-bit	
SFD2038	Initial speed low 16-bit	
SFD2039	Initial speed high 16-bit	
SFD2040	Stop speed low 16-bit	
SFD2041	Stop speed high 16-bit	
SFD2042	Follow performance	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks
SFD2043	Follow feedforward compensation	0~100, %
	Y10 (group 4 )	parameters)
SFD2050	Pulse default speed low 16-bit	Pulse is sent at 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	
SFD2055	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
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	1~100, 100 means the time constant is 1 Tick, 1 means the time constant is 100 Ticks

SFD2063	Follow feedforward compensation	0~100, %				
	*					
Y11 (common parameters)						
SFD2070	Pulse parameters	Same to SFD900				
SFD2071	Pulse sending mode	Bit 0: pulse sending mode 0: complete mode; 1: continue 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				
SFD2078	Gear clearance positive compensation					
SFD2079	Gear clearance negative compensation					
SFD2080	Electrical origin position low 16-bit					
SFD2081	Electrical origin position high 16-bit					
SFD2082	Signal terminal switch state	<ul> <li>Bit0: Origin Signal Switch State Settings</li> <li>Bit1:Z Phase Switch State Settings</li> <li>Bit2: Positive Limit Switching State Settings</li> <li>Bit3: Negative Limit Switching State Settings</li> <li>0: Normally open (positive logic), 1: Normally</li> <li>closed (negative logic); default is 0</li> </ul>				
SFD2084	Near-point signal terminal setting					
SFD2085	Z phase terminal setting	Bit0~Bit7: Specify the number of the X terminal, 0xFF is no terminal				
SFD2087	Limit terminal setting	<ul><li>Bit7~Bit0: Specifies the X terminal number of the positive limit, and 0xFF is no terminal.</li><li>Bit15~Bit8: Specifies the X terminal number of the negative limit, and 0xFF is no terminal.</li></ul>				
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					

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SFD2096	Mechanical origin position high 16-bit				
SFD2097	Z phase number				
SFD2098	CLR signal delay time	Default is 20, unit: ms			
	Grinding wheel radius (polar				
SFD2099	coordinates)	Low 16-bit			
SFD2100		High 16-bit			
SFD2101	Soft limit positive value	Low 16-bit			
SFD2102	· · · · · · · · · · · · · · · · · · ·	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.			
	Acceleration time of pulse default				
SFD2122	speed				
	deceleration time of pulse default				
SFD2123	speed				
SFD2124	Accerlation and deceleration time				
		Bit1~Bit0: acc/dec mode			
		00: linear acc/dec			
0500105		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				
SFD2131	Stop speed high 16-bit				
SFD2132	Follow porformance	1~100, 100 means the time constant is 1 Tick,			
SFD2152	Follow performance	1 means the time constant is 100 Ticks			
SFD2133	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			
SFD2141	Pulse default speed high 16-bit	speed is 0.			
SFD2142	Acceleration time of pulse default				
51102142	speed				
SED2142	deceleration time of pulse default				
SFD2143	speed				
	Accerlation and deceleration time				

		D'(1 D'(0 (1 1			
		Bit1~Bit0: acc/dec mode			
	Acceleration/deceleration mode	00: linear acc/dec			
SFD2145		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, %			
	Follow reedior ward compensation	0~100, 78			
•••	Y11 (group 3	naramatars)			
SFD2160	Pulse default speed low 16-bit	Pulse is sent at the default speed when the			
SFD2160	Pulse default speed high 16-bit	speed is 0.			
51 D2101	Acceleration time of pulse default				
SFD2162	speed				
SFD2163	deceleration time of pulse default speed				
SFD2164	Accertation and deceleration time				
		Bit1~Bit0: acc/dec mode			
		00: linear acc/dec			
		01: S curve acc/dec			
SFD2165	Acceleration/deceleration mode	10: sine curve acc/dec			
		11: reserved			
		Bit15~Bit2: reserved			
SFD2166	Max speed low 16-bit				
SFD2160	Max speed high 16-bit				
SFD2167	Initial speed low 16-bit				
SFD2169	Initial speed high 16-bit				
SFD2109 SFD2170	Stop speed low 16-bit				
SFD2170	Stop speed high 16-bit				
51 521/1	Stop op our mgm to ou	$1 \sim 100, 100$ means the time constant is 1 Tick,			
SFD2172	Follow performance	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.			

eleration time of pulse default d leration time of pulse default d	
leration time of pulse default	
-	
d	
erlation and deceleration time	
	Bit1~Bit0: acc/dec mode
	00: linear acc/dec
Acceleration/deceleration mode	01: S curve acc/dec
	10: sine curve acc/dec
	11: reserved
	Bit15~Bit2: reserved
speed low 16-bit	
speed high 16-bit	
l speed low 16-bit	
ll speed high 16-bit	
speed low 16-bit	
speed high 16-bit	
	1~100, 100 means the time constant is 1 Tick,
ow performance	1 means the time constant is 100 Ticks
w feedforward compensation	0~100, %
	leration/deceleration mode speed low 16-bit speed high 16-bit I speed low 16-bit I speed high 16-bit speed low 16-bit speed high 16-bit speed high 16-bit

## Appendix 4. External interruption terminal list

XG series PLC external interrupt terminal allocation is as follows: **XG1 series 16 I/O** 

	Poi	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	

## XG2 series 26 I/O

	Pointer		Disable		
			interruption	Note	
Input terminal			instruction		
	Rising	Falling			
	interruption	interruption			
X2	10000	I0001	SM050		
X3	I0100	I0101	SM051		
X4	I0200	I0201	SM052		
X5	10300	I0301	SM053	High speed	
X6	I0400	I0401	SM054	interrupt,	
X7 I0500		I0501	SM055	repetition period	
X10	10600	I0601	SM056	10khz	
X11	10700	I0701	SM057		
X12	10800	I0801	SM058		
X13	10900	I0901	SM059		
X16	X16 I1000		SM060	Low speed	
				interrupt,	
X21	21 I1100 I		SM061	repetition period	
				1khz	

## 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 speed counter			Pulse		
	timing				output		
XG1-1	6T4						
	ET0						
	ET2				HSC6		
	ET4			HSC4			
	ET6	HSC0					
	ET8		HSC2				
	ET10					Y3	
	ET12					Y3	
	ET14					Y2	
	ET16					Y2	
	ET18					Y1	
	ET20					Y1	
	ET22					Y0	
	ET24					Y0	

%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.

*2: XG2 series PLC has no resource conflict.



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