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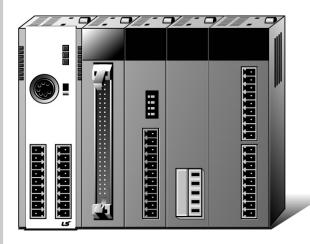
Programmable Logic Control

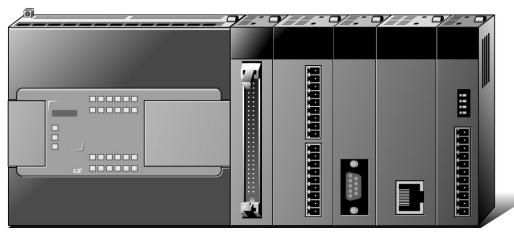
XGB Built-in Positioning

XGT Series

User Manual

XGB Modular Type XBC High-end/Standard Type XEC High-end/Standard Type







Safety Instructions

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.
- Keep this manual within easy reach for quick reference.



Before using the product ...

For your safety and effective operation, please read the safety instructions thoroughly before using the product.

- ► Safety Instructions should always be observed in order to prevent accident or risk with the safe and proper use the product.
- ► Instructions are divided into "Warning" and "Caution", and the meaning of the terms is as follows.

Warning This symbol indicates the possibility of serious injury or death if some applicable instruction is violated

This symbol indicates the possibility of severe or slight injury, and property damages if some applicable instruction is violated

Moreover, even classified events under its caution category may develop into serious accidents relying on situations. Therefore we strongly advise users to observe all precautions properly just like warnings.

► The marks displayed on the product and in the user's manual have the following meanings.

Be careful! Danger may be expected.

Be careful! Electric shock may occur.

► The user's manual even after read shall be kept available and accessible to any user of the product.

Safety Instructions for design process

⚠ Warning

- Please install a protection circuit on the exterior of PLC so that the whole system may operate safely regardless of failures from external power or PLC. Any abnormal output or operation from PLC may cause serious problems to safety in whole system.
 - Install protection units on the exterior of PLC like an interlock circuit that deals with opposite
 operations such as emergency stop, protection circuit, and forward/reverse rotation or install an
 interlock circuit that deals with high/low limit under its position controls.
 - If any system error (watch-dog timer error, module installation error, etc.) is detected during CPU operation in PLC, all output signals are designed to be turned off and stopped for safety. However, there are cases when output signals remain active due to device failures in Relay and TR which can't be detected. Thus, you are recommended to install an addition circuit to monitor the output status for those critical outputs which may cause significant problems.
- Never overload more than rated current of output module nor allow to have a short circuit.
 Over current for a long period time maycause a fire .
- Never let the external power of the output circuit to be on earlier than PLC power, which may cause accidents from abnormal output oroperation.
- Please install interlock circuits in the sequence program for safe operations in the system when exchange data with PLC or modify operation modes using a computer or other external equipments Read specific instructions thoroughly when conducting control operations with PLC.

Safety Instructions for design process

► I/O signal or communication line shall be wired at least 100mm away from a high-voltage cable or power line. Fail to follow this

Safety Instructions on installation process

⚠ Caution

- ▶ Use PLC only in the environment specified in PLC manual or general standard of data sheet. If not, electric shock, fire, abnormal operation of the product may be caused.
- Before install or remove the module, be sure PLC power is off. If not, electric shock or damage on the product may be caused.
- Be sure that every module is securely attached after adding a module or an extension connector. If the product is installed loosely or incorrectly, abnormal operation, error or dropping may be caused. In addition, contact failures under poor cable installation will be causing malfunctions as well.
- ▶ Be sure that screws get tighten securely under vibrating environments. Fail to do so will put the product under direct vibrations which will cause electric shock, fire and abnormal operation.
- Do not come in contact with conducting parts in each module, which may cause electric shock, malfunctions or abnormal operation.

Safety Instructions for wiring process

∕ Warning

- Prior to wiring works, make sure that every power is turned off. If not, electric shock or damage on the product may be caused.
- After wiring process is done, make sure that terminal covers are installed properly before
 its use. Fail to install the cover may cause electric shocks.

⚠ Caution

- Check rated voltages and terminal arrangements in each product prior to its wiring process. Applying incorrect voltages other than rated voltages and misarrangement among terminals may cause fire or malfunctions.
- ▶ Secure terminal screws tightly applying with specified torque. If the screws get loose, short circuit, fire or abnormal operation may be caused. Securing screws too tightly will cause damages to the module or malfunctions, short circuit, and dropping.
- Be sure to earth to the ground using Class 3 wires for FG terminals which is exclusively used for PLC. If the terminals not grounded correctly, abnormal operation or electric shock may be caused.
- ▶ Don't let any foreign materials such as wiring waste inside the module while wiring, which may cause fire, damage on the product or abnormal operation.
- Make sure that pressed terminals get tighten following the specified torque. External connector type shall be pressed or soldered using proper equipments.

Safety Instructions for test-operation and maintenance

Warning

- Don't touch the terminal when powered. Electric shock or abnormal operation may occur.
- > Prior to cleaning or tightening the terminal screws, let all the external power off including **PLC power.** If not, electric shock or abnormal operation may occur.
- ▶ Don't let the battery recharged, disassembled, heated, short or soldered. Heat, explosion or ignition may cause injuries or fire.

- ▶ Do not make modifications or disassemble each module. Fire, electric shock or abnormal operation may occur.
- > Prior to installing or disassembling the module, let all the external power off including **PLC power.** If not, electric shock or abnormal operation may occur.
- ▶ Keep any wireless equipment such as walkie-talkie or cell phones at least 30cm away from PLC. If not, abnormal operation may be caused.
- When making a modification on programs or using run to modify functions under PLC operations, read and comprehend all contents in the manual fully. Mismanagement will cause damages to products and accidents.
- Avoid any physical impact to the battery and prevent it from dropping as well. Damages to battery may cause leakage from its fluid. When battery was dropped or exposed under strong impact, never reuse the battery again. Moreover skilled workers are needed when exchanging batteries.

Safety Instructions for waste disposal



/ Caution

• Product or battery waste shall be processed as industrial waste. The waste may discharge toxic materials or explode itself.

Revision History

Version	Date	Remark	Page
V 1.0	2008.1	Positioning first edition according to XGB user manual separation	
		2. Added contents	1-8
		(1) IO wiring method through smart link board	3-1
		(2) Positioning function list	3-26
		(3) How to check the positioning	6-1
		(4) Positioning monitoring package	8-1
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		3. Modified contents	1-6
		(1) IO signal allocation	4-1
		(2) Positioning parameter setting method	5-1
		(3) Positioning instruction contents	-
		(4) Modifying safety precaution for safety	
V1.1	2008.3	Added type and function according to developing XGB compact type basic unit (XBC-DxxxH)	-
V1.2	2009.8	1. Added type and function according to developing XGB compact type basic unit (XEC-DxxxH)	-
		(1) Description on positioning flag added	
		(2) Description on positioning instruction added	
		(3) Positioning program example added	
V1.4	2011.6	type and function according to developing XGB compact type	-
		basic unit (XBC-DxxxS(U)) added	
V1.5	2013.7	Motor Wiring Examples Added(XGT-Servo:XDL-S)	APP3-6, 7
		2. Modules(XB(E)C-DPxxSU) added	1-9,10
			2-2,3
V1.6	2013.12	1. PWM instruction added	5-47,95
		2. HOME, DOG Device Modified	3-2,3-3
		3. Domain Of Homepage Changed	Front/Back cover
V1.7	2015.07	Input/Output contact point list Added	Ch2, Ch8
		2. XEC Function block list Added	APP2
V1.8	2020.06	1. Changed company name to LS ELECTRIC	-
	_2_0.00	Correction according to XGB Positioning K area	3-51, 3-52
		Flag for Positioning Instruction and Command	· ,
V1.9	2022.09	Domain changed	-
V2.0	2024.06	Warranty period, scope changed	-

Safety Instructions

- X The number of User's manual is indicated right part of the back cover.
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About User's Manual

Thank you for purchasing PLC of LS ELECTRIC Co.,Ltd.

Before use, make sure to carefully read and understand the User's Manual about the functions, performances, installation and programming of the product you purchased in order for correct use and importantly, let the end user and maintenance administrator to be provided with the User's Manual.

The User's Manual describes the product. If necessary, you may refer to the following description and order accordingly. In addition, you may connect our website(http://www.ls-electric.com/) and download the information as a PDF file.

Relevant User's Manuals

Title	Description		
XG5000 user's manual (for XGK/XGB)	It describes how to use XG5000 software about online functions such as programming, printing, monitoring and debugging when using XGB series products.	10310000512	
XG5000 user's manual (for XGI/XGR/XEC)	It describes how to use XG5000 software about online functions such as programming, printing, monitoring and debugging when using XGB (IEC language) series products	10310000834	
XGK/XGKB Instructions & Programming	XGK/XGKB Instructions & It is the user's manual for programming to explain how to use instructions that are used PLC system with XGB CPU.		
XGI/XGR/XEC Instructions & Programming	It is the user's manual for programming to explain how to use instructions & instructions that are used in XGB (IEC language) CPU		
XGB hardware	XGB hardware It describes power, IO, extension specification and system configuration, built-in high speed counter of XGB main unit.		
XGB hardware (IEC) It describes power, IO, extension specification a configuration, built-in high speed counter of XGB (IEC)		10310000983	
XGB Analog user's manual	temperature input module, system configuration and built-in PID		
XGB Cnet I/F	It is the user's manual about XGB Cnet I/F that describes built-in communication function and external Cnet I/F module of XGB basic unit	10310000816	
XGB FEnet I/F	10310000873		

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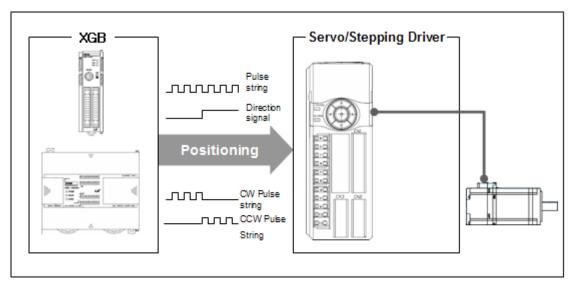
Chapter 1 General

XGB series transistor output type contains 2 positioning axes. This manual describes the specifications and usage of positioning.

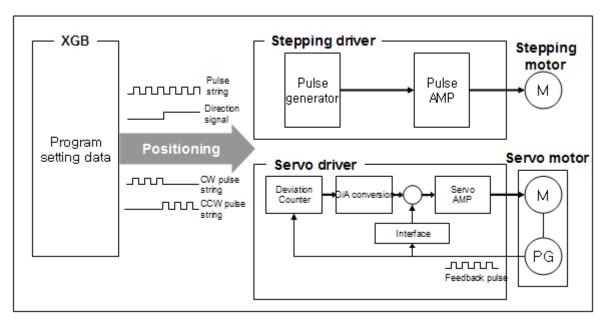
1.1 General

1.1.1 Purpose of position function

The purpose of position function is to exactly move an object from the current position to a designated position and this function executes highly precise position control by sending a position pulse string signal to types of servo drive or stepping motor control drive. For applications, it may be widely used; for instance, machine tools, semiconductor assembling machine, grinder, small machine center, lifter and etc.



< XGB positioning function general >

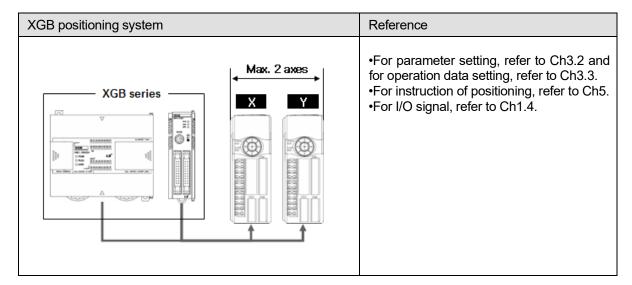


< Positioning system inner block diagram >

1.1.2 Features

Positioning function features the followings.

- (1) Max. two axis, 100kpps positioning
 - XGB PLC can execute positioning of up to 2 axes with up to 100kpps.
- (2) Diversity of positioning function
 - XGB PLC contains various functions necessary for position system such as position control at any temporary position or constant speed operation.
 - (a) Operation data containing position address, operation method and operation pattern may be set up to 80 steps per axis (based on "H" type). It executes position function by using this operation data.
 - (b) Linear control is available by using each operation data
 - The control can also perform single position control by one operation data and continuous position control by several operation data
 - (c) linear interpolation control is available.
 - (d) According to operation data and control types designated by parameters, position control, speed control, position/speed switching control and position/speed switching control are available
 - (e) It also provides various home return functions.
 - 1) Home return can be chosen among the following three.
 - Origin detection after DOG Off
 - •When DOG On, Origin detection after deceleration
 - Origin detection by DOG
 - 2) temporary position can be set as machine's origin by using floating origin setting function.
- (3) Easy maintenance
 - It saves data such as position data and parameter into flash memory of main unit permanently.
 - The modified data during positioning can be preserved in the flash memory by application instruction (WRT/APM_WRT instruction).
- (4) XG5000 can perform self-diagnosis, monitor and test.
 - (a) Diagnosing of I/O signal line.
 - (b) It can test all functions of built-in positioning or check the current operation status without program through special module monitoring
 - (c) It is easy to take action because the user can check error by error occurrence flag (Ch0: K4201, ,%KX6721 Ch1: K4301, %KX6881) and error code (Ch0: K427, %KW427 Ch1: K437, %KW437) easily.



1.2 Performance specifications

Performance specifications of XGB built-in positioning

The performance specifications of positioning function are as follows.

Here standard type indicates XBM-DN_□S/ XBC-DN_□S(U) and high end type indicate XBC(XEC)-DN_□H.

Each type is indicated as 'S' type and 'H' type.

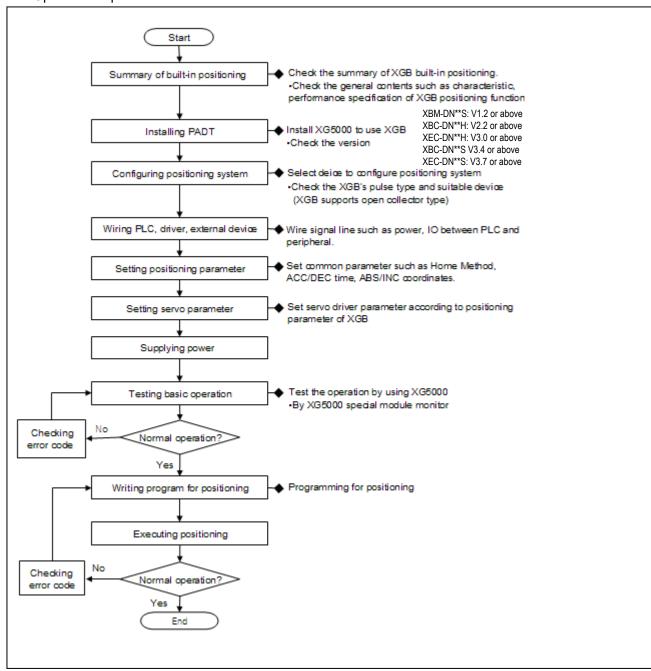
Item Standard type ("S" type) High-end type ("H" type) No. of control axis 2 axes Interpolation 2 axes linear interpolation Pulse output method Open collector (DC 24V) Pulse output type Pulse + Direction Control type Position control, speed control, speed/position switching, position/speed switching Control unit Pulse 30 data areas per axis (operation step no. 1 ~ 30) 80 data areas per axis (operation step no. 1 ~ 80) * XBC-DN□□S(U) supports 80 data areas per axis (operation step no. 1 ~ 80) Position data Setting through Embedded parameter of XG5000 → permanen auto-preservation		Type	XGB Basic Unit (Transistor output)				
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Position data Setting method Setting through Embedded parameter of XG5000 → permanen auto-preservation Setting through dedicated monitoring package → permanen preservation by PADT instruction Setting through K area dedicated for positioning → permanent preservation by application instruction (WRT/APM_WRT instruction) Setting through K area dedicated for positioning → permanent preservation by application instruction (WRT/APM_WRT instruction) Setting through K area dedicated for positioning by K area Parameter, operation data → Flash memory K area → RAM (super capacitor back up for S type/ battery back up for H type) (Saving them in the flash memory is available by application instruction(WRT/APM_WRT)) Position method Absolute method / Incremental method Position address range 1 ~ 100,000 pps (1pps unit) Trapezoid-shaped Acc/dec processing Trapezoid-shaped Acc/dec time 1 ~ 10,000 ms (selectable from 4 types of acc/dec patterns) Max. output pulse 100 kpps Nax output pulse	Contro	ol unit	Pulse				
Position data Setting method Setting through dedicated monitoring package → permanen preservation by PADT instruction Setting through K area dedicated for positioning → permanent preservation by application instruction (WRT/APM_WRT instruction) Positioning monitor Special module monitoring of XG5000 / monitoring by K area Parameter, operation data → Flash memory K area → RAM (super capacitor back up for S type/ battery back up for H type) (Saving them in the flash memory is available by application instruction(WRT/APM_WRT)) Position method Absolute method / Incremental method Position address range 1 ~ 100,000pps(1pps unit) Acc/dec processing Trapezoid-shaped Acc/dec time 1 ~ 10,000 ms (selectable from 4 types of acc/dec patterns) Max. output pulse Additional definition instruction Setting through dedicated monitoring package → permanen preservation by PADT instruction Setting through dedicated monitoring package → permanen preservation by PADT instruction Setting through dedicated monitoring package → permanen preservation by PADT instruction Setting through dedicated monitoring package → permanen preservation by PADT instruction Setting through dedicated monitoring package → permanen preservation by PADT instruction (WRT/APM_WRT instruction) Setting through dedicated monitoring package → permanen preservation by PADT instruction Setting through dedicated monitoring package permanen preservation by PADT instruction Setting through dedicated for positioning **Permanen preservation by PADT instruction Setting through dedicated monitoring package permanen preservation by PADT instruction Setting through K area dedicated for positioning **Permanen preservation by PADT instruction Setting through K area dedicated for positioning **Permanen preservation by PADT instruction Setting through K area dedicated for position instruction Setting through K area dedicated for position instruction Setting through K area dedicated for position instruction Setting through K area dedicated for pos			(operation step no. 1 ~ 30) * XBC-DN□□S(U) supports 80				
Position method Position address range Position address range Trapezoid-shaped Acc/dec time 1 ~ 10,000 ms (selectable from 4 types of acc/dec patterns) Position by PADT instruction Position by Application instruction (WRT/APM_WRT instruction) Position method Position method Position address range 1 ~ 100,000 pps (1pps unit) Position method Position address range 1 ~ 100,000 ms (selectable from 4 types of acc/dec patterns) Position address range Trapezoid-shaped Position address range Position addr	Position	on data					
Setting through K area dedicated for positioning → permanent preservation by application instruction (WRT/APM_WRT instruction) Positioning monitor Special module monitoring of XG5000 / monitoring by K area Parameter, operation data → Flash memory K area →RAM (super capacitor back up for S type/ battery back up for H type) (Saving them in the flash memory is available by application instruction(WRT/APM_WRT)) Position method Absolute method / Incremental method Position address range Speed range 1 ~ 100,000pps(1pps unit) Acc/dec processing Trapezoid-shaped Acc/dec time 1 ~ 10,000 ms (selectable from 4 types of acc/dec patterns) Max. output pulse 100 kpps			_				
Back-up Parameter, operation data → Flash memory K area →RAM (super capacitor back up for S type/ battery back up for H type) (Saving them in the flash memory is available by application instruction(WRT/APM_WRT)) Position method Absolute method / Incremental method Position address range			moulou	→ permanent preservation by application instruction			
Back-up K area →RAM (super capacitor back up for S type/ battery back up for H type) (Saving them in the flash memory is available by application instruction(WRT/APM_WRT)) Position method Absolute method / Incremental method Position address range -2,147,483,648 ~ 2,147,483,647(Pulse) Speed range 1 ~ 100,000pps(1pps unit) Acc/dec processing Trapezoid-shaped Acc/dec time 1 ~ 10,000 ms (selectable from 4 types of acc/dec patterns) Max. output pulse 100 kpps	Position	oning monitor	Special module monitoring of XG5000 / monitoring by K area				
Frange Speed range 1 ~ 100,000pps(1pps unit) Acc/dec processing Trapezoid-shaped Acc/dec time 1 ~ 10,000 ms (selectable from 4 types of acc/dec patterns) Max. output pulse 100 kpps	Back-up		K area →RAM (super capacitor back up for S type/ battery back up for H type) (Saving them in the flash memory is available by application				
Frange Speed range 1 ~ 100,000pps(1pps unit) Acc/dec processing Trapezoid-shaped Acc/dec time 1 ~ 10,000 ms (selectable from 4 types of acc/dec patterns) Max. output pulse 100 kpps	Po	Position method	1				
Acc/dec processing Trapezoid-shaped	sition		-2,147,483,648 ~ 2,147,483,647(Pulse)				
Acc/dec time $1 \sim 10,000$ ms (selectable from 4 types of acc/dec patterns) Max. output pulse 100 kpps		Speed range	1 ~ 100,000pps(1pps unit)				
Max. output pulse 100 kpps		Acc/dec processing	Trapezoid-shaped				
	Acc/dec time		$1 \sim 10{,}000$ ms (selectable from 4 types of acc/dec patterns)				
Max. connection distance 2 m	Max.	output pulse	100 kpps				
	Max.	connection distance	2 m				

< Performance specifications >

1.3 Operation Sequence of Positioning

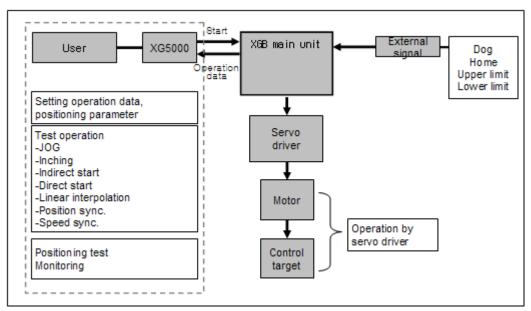
1.3.1 Operation Sequence of Positioning

Operation sequence is as follows.



1.3.2 Flow of position signal

Flow of position signal is as follows.



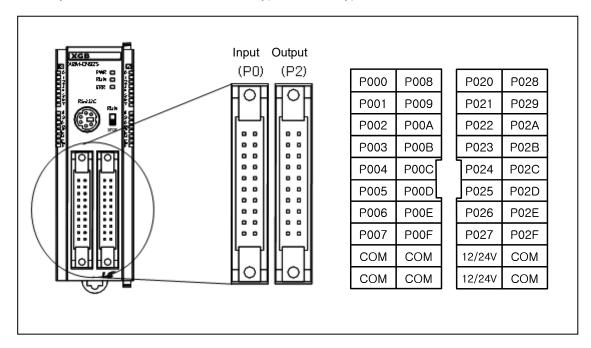
< XGB Positioning signal flow >

1.4 I/O Signal Allocation

1.4.1 Allocation of modular type input signal

In case of modular type, external I/O signal for built-in function is allocated as follows.

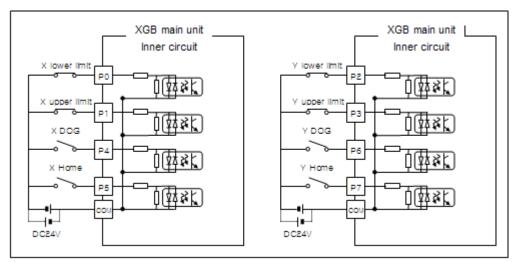
(1) Pin array of I/O connector Pin array of I/O connector of XGB modular type transistor type basic unit is as follows.



(2) Allocation of external input signal

Signal name	Input contact point no.		Detail	-	
External lower	X axis	P0000	detected at the falling edge of input contact point.		
limit signal (LimitL)	Y axis P0002		detected at the falling edge of input contact point.	Normally closed	
External upper	X axis	detected at the falling edge of input contact point.		(B contact point)	
limit signal (LimitH)	Y axis	P0003	detected at the falling edge of input contact point.		
DOG signal	X axis	P0004	When homing, detected at the rising edge		
DOG SIGNAL	Y axis	P0006	When homing, detected at the rising edge	Normally open contact point	
ORIGIN signal	X axis	P0005	When homing, detected at the rising edge (A contact		
Ortiona signal	Y axis	P0007	When homing, detected at the rising edge		
Input common X/Y axis COM		СОМ	Input common		

(3) Example of wiring the external input signal Example of wiring the external input signal is as follows.



< Example of wiring the external input signal >

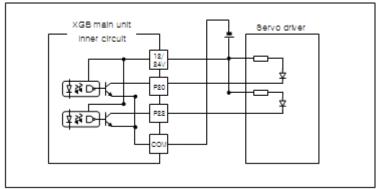
1.4.2 Allocation of modular type output signal

(1) Allocation of output signal

When using the positioning function, the output signal is allocated as shown below.

Signal name	Input contact point no.		Detail	-
Dulgo output	X axis	P0020	Positioning X axis pulse string output contact point (Open collector output)	
Pulse output	Y axis P0021 Positioning Y axis pulse string output contact point (Open collector output)		Low Active and High Active is	
Direction output	X axis	P0022	Positioning X axis direction output contact point (Open collector output)	selectable in parameter setting.
Direction output	Y axis	P0023	Positioning Y axis direction output contact point (Open collector output)	
External 24V X/Y DC12 For external pow		For external power (12/24V) supply		
Output X/Y COM Output common		Output common		

(2) Example of wiring external input signal Example of wiring external output signal is as follows.

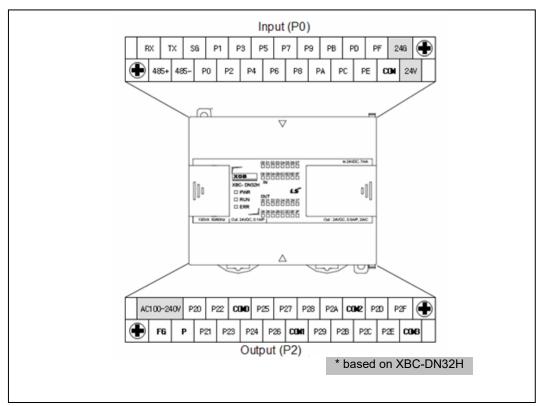


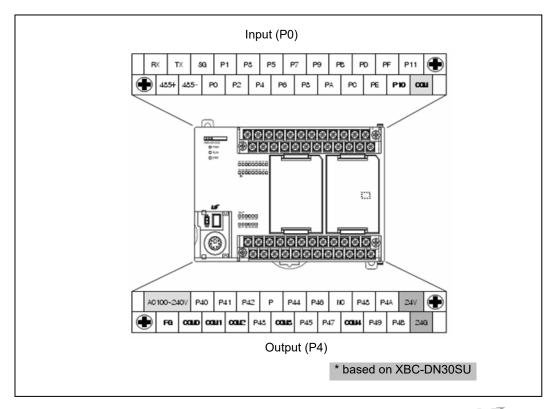
1.4.3 Allocation of compact type (S/H type) input signal

In case of compact standard/high-end type, external input signal for built-in positioning is allocated as follows

(1) I/O terminal block array

Array of XGB transistor output type basic unit is as figure below.





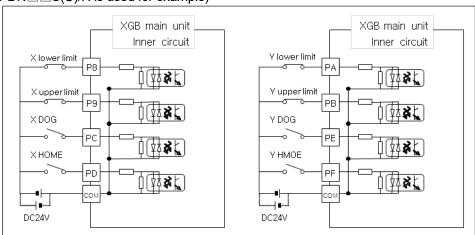
(2) Allocation of external input signal

	Input contact point no.				
Signal name	Axis	XBC-DN(P) □□S(U)/H	XEC-DN(P) □□H	Operation content	Reference
External lower	X axis	P0008	%IX0.0.8	Detected at the falling edge of input contact point	
limit (LimitL)	Y axis	P000A	%IX0.0.10	Detected at the falling edge of input contact point.	Normally closed
External upper	X axis	P0009	%IX0.0.9	Detected at the falling edge of input contact point	contact point (B contact point)
limit (LimitH)	Y axis	P000B	%IX0.0.11	Detected at the falling edge of input contact point	
DOG signal	X axis	P000C	%IX0.0.12	When homing, detected at rising edge	
DOG Signal	Y axis	P000E	%IX0.0.14	When homing, detected at rising edge	Normally opened contact point
ORIGIN signal	X axis	P000D	%IX0.0.13	When homing, detected at rising edge	(A contact point point)
	Y axis	P000F	%IX0.0.15	When homing, detected at rising edge	
Input common	X/Y axis	СОМ		Input common terminal	

(3) Wiring example of external input signal

In case of using positioning function of XGB compact main unit, wiring example of input signal is as follows.

(XBC-DN \square S(U)/H is used for example)



< XGB high-end positioning input signal wiring example >

Allocation of compact type (S/H type) output signal 1.4.4

(1) Allocation of output signal

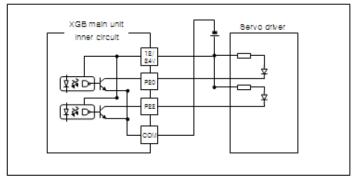
In case of using built-in positioning of XGB compact standard/high-end type main unit, output signal is allocated as follows.

	Input	contact noin	t no		Operation content		
Signal name	Axis	XBC- DN□□H	XBC- DN(P)	XEC- DN(P)	Pulse + Direction mode	CW/CCW mode	Reference
Pulse output	X axis	P00020	P00040 %QX0.0.0 pulse string (Open collector output) string output (Open collector output)		(Open collector		
(CW output)	Y axis	P00021	P00041	%QX0.0.1	Positioning Y axis pulse string (Open collector output)	Y axis CW pulse string output (Open collector output)	Low Active and High Active is
Direction output	X axis	P00022	P00042	X axis direction output contact point (Open collector output)		X axis CCW pulse string output (Open collector output)	selectable in parameter setting
(CCW output)	Y axis	P00023	P00043	%QX0.0.3	Y axis direction output constant point (Open collector output)	Y axis CCW pulse string output (Open collector output)	
External 24V	X/Y axis	Р			Terminal for externation		
Input common	X/Y axis	COM0 ~ 7			Output common ter	minal	

^{*} Standard type (XBC-DN(P) = S(U)) supports only "pulse + direction mode".

(2) Wiring example of external input signal

In case of using positioning function of XGB high-end basic unit, wiring example is as follows.



1.5 I/O wiring by using Smart Link Board

1.5.1 Smart link board

When using positioning function, easy wiring is available by connecting the I/O connector with smart link board.

The available smart link and I/O cable are as follows.

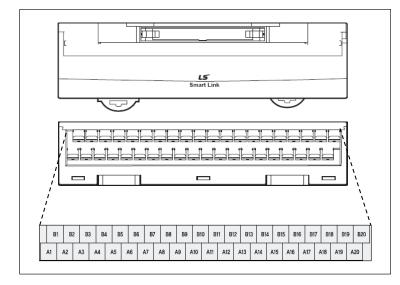
XGB		Smar	t link		Conn	ection cable
Classification	Model	Model	The no. of pin	Model	Length	Content
Main unit	XBM- DN32S XBM- DN16S	SLP- T40P	40	SLT- CT101- XBM	1m	For main unit connection (20Pin + 20Pin)
	XBE- DC32A	SLP- T40P	40	SLT- CT101- XBE	1m	For extension module
Extension module	VD5	SLP- T40P	40	SLT- CT101- XBE	1m	connection (40Pin)
	XBE- TN32A	SLP- RY4A	40	SLP- CT101- XBE	1m	For extension module connection (40Pin) Exclusive for relay built-in SLP type

It describes wring of XGB, SLP-T40P and SLT-CT101-XBM.

For wring of other smart link boards or XGB extension module, refer to XGB user manual for hardware.

(1) SLT-T40P terminal array

Terminal array of SLP-T40P is as follows.

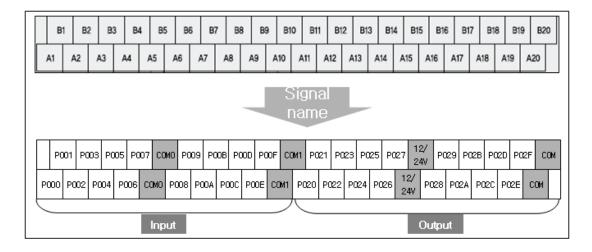


Item	Specification				
Rated voltage	AC/DC 125[V]				
Rated current	Max. 1[A]				
Withstanding voltage	600V 1min				
Insulation resistor	100 MΩ (DC500V)				
Cable specification	1.25[mm²] or below				
Terminal/screw	M3 X 8L				
Torque	6.2 kg f.cm or above				
Terminal material	PBT, UL94V-0				
Weight	186g				

(2) Wiring of SLT-T40P and XGB main unit Wiring of XGB main unit through SLP-T40P and SLT-CT101-XBM is as follows



At this time, relationship of XGB I/O signal and Smart link board terminal number is as follows. The following figure describes signal allocation when SLT-CT101-XBM is used as connection cable. When the user makes the cable, make sure that wring is done as figure below.



Chapter 2 General Specification

2.1 General Specification

General specification is as follows.

No.	ltem			Specification	s		Related standards		
1	Operating temperature			0 ~ 55 °C					
2	Storage temperature			–25 ~ +70 °C	;				
3	Operating humidity		5 ~ 95	%RH, no cond	ensation				
4	Storage humidity								
		If	If intermittent vibration exists -						
		Frequency	Acc	eleration					
		$10 \le f < 57Hz$		_	3.5mm				
_	Vibration	$57 \le f \le 150$ Hz 9.8m/s ² – 10 tim							
5	immunity	If	continuous v	X, Y and Z	IEC61131-2				
		Frequency	Acc	eleration	Amplitude	directions,			
		10 ≤ f < 57Hz		each					
		57≤ f ≤ 150Hz	4]					
		Max. impact accel	eration : 147	' m/s ²					
6	Shocks	• Time allowed : 11	ms				IEC61131-2		
		Pulse waveform :	half sine wa	ve (3 times to)	Κ, Y and Z direction	ns, each)			
		Rectangular		AC	: ±1,500 V		Test specifications		
		impulse noise		DC	: ±900 V		of LS ELECTRIC		
		Electrostatic		Voltage v 414	/ (contact discharge	۵)	IEC61131-2		
		discharge		vollage . 4kv	(contact discharge	=)	IEC61000-4-2		
7	Najaa immuunitu	Radiating					IEC61121 2		
_ ′	Noise immunity	electronic field		80 ~ 1,0	000 ^{Mlz} , 10V/m		IEC61131-2, IEC61000-4-3		
		noise					IEC01000-4-3		
		Fast transient /	Tuno	Power	Digital/Analogue	e Input/Output,	IEC61131-2		
		Burst noise	Туре	IEC61000-4-4					
		Buist noise	15001000-4-4						
8	Environment	Free of corrosive ga							
9	Altitude	Lower than 2,000m							
10	Pollution degree	2 and lower							
11	Cooling method	Natural air cooling t	уре						

Note

1) IEC(International Electro technical Commission)

: International private group facilitating international cooperation of electric/electronic standardization, issuing international standards and operating the compliance evaluation systems.

2) Pollution degree

: As an index representing the pollution degree of an environment to determine the insulation of a device, pollution degree 2 generally means the status generating non-conductive contamination. However, it also contains the status generating temporarily conduction due to condensation.

2.2 Power Specification

Power specification of XGB series main unit is as follows.

2.2.1 Modular type(XBM-DN□□S) power specification

	Item	Specification
	Rated input voltage	DC24V
	Input voltage range	DC20.4~28.8V(-15%, +20%)
	Inrush current	70APeak or below
Input	Input current	Max. 1A (Typ. 550 ^{mA})
	Efficiency	60% or above
	Allowed temporary cutoff	1 ms or below
	Output voltage	DC5V (±2%)
Output	Output current	Max 1.5 A
Volta	ge status display	When power is normal, PWR LED On
Cab	ole specification	0.75 ~ 2 mm²

2.2.2 Compact standard type (XB(E)C-DR/DN/DP□□S(U)) power specification

				Specification					
	Item		XB(E)C- DR(N)(P)20S(U) /DR(N)(P)30S(U)	DR(N)(P)20S(U)					
	Rated inpu	ıt voltage	AC 100 ~ 240 V						
	Input volta	ge range	AC85~264V(-15%, +10	0%)					
	Inrush o	current	50A _{Peak} or below						
Input	Input c	urrent	0.5A or below (220V),	1A or below (110V)					
	Efficie	ency	65% or above						
	Allowed temporary		10 ms or below						
	Output	DC5V	1.5A	2A	2.5A				
	voltage	DC24V	0.3A	0.3A	0.5A				
Output	Output	DC5V	DC 4.9 ~ 5.1V (±2%)	DC 4.9 ~ 5.15V (-2%, +	-3%)				
	voltage ripple	DC24V	DC21.6~26.4 V(±10%)						
Voltage status display			When power is normal, PWR LED On						
Са	ble specifica	tion	0.75 ~ 2 mm ²						

^{*} For protection of power supply, use power supplier which has maximum 4A fuse.

Compact high-end type (XB(E)C-DR/DN/DP□□H) power specification 2.2.3

				Spec	ification				
	Item		XBC- /DR32H /DN32H	/DR32H DR64H DR64H /DN64					
		d input age	AC 100 ~ 240 V						
	-	/oltage nge	AC85~264V(-15%	, +10%)					
Input	Innut Innut 50APeak or less								
mpat	Input o	current	0.5A or less (220V), 1A or less (110V)						
	Effici	iency	65% or above						
		wed ary cutoff	10 ms or less (Checking is necessary)						
	Rated	DC5V	2A		3A				
	output	DC24V	0.4A		0.6A				
Output	Output	DC5V	DC 4.9 ~ 5.15V (-2	DC 4.9 ~ 5.15V (-2%, +3%)					
	voltage ripple	DC24V	DC21.6~26.4 V(±10%)						
Voltag	je status d	display	In case output voltage is normal, LED On						
Cabl	e specific	ation	0.75 ~ 2 mm ² (Ch	necking is necessar	y)				

^{*} For protection of power supply, use power supplier which has maximum 4A fuse.

2.3 I/O Specification

It describes I/O specification when P0000~P000F is used for built-in positioning. For using P0000~P000F as general I/O, refer to XGB user manual for hardware

2.3.1 Input Specification

(1) Modular type input contact point specification

Contac t point	X axis	P0000	P0001		P000	4	P0	005	Ref.
no.	Y axis	P0002	P0003		P000	6	P0	007	Nei.
Signal	name	External lower limit	External upper limit		DOC	6	ME		
	l input age	DC24V (DC20.4~28.8V (-1	5/20)%, rip	ple rate 5º	% or les	ss))	
	l input rent	al	oout 7 mA/24V			About 4	nA/24V		
Insul met	ation hod		Photo coupler insulation						
Input im	pedance	Abou	About 3.3 kΩ About 5.6 kΩ						
O voltage/			DC 19V or above/5.7 mA or above DC 19V or above /3.4 mA or above						
O voltage/		DC 6V or less	C 6V or less/1.8 mA or less DC 6V or less/1.1 mA or less						
Respon	se time	0.5 ms or less (When used for positioning)							
Min. inp	ut width		100 μ	or a	above				
					Pin	Contact point	Pin	Contact point	
					B10	P00	A10	P08	ПОП
		Г		\neg	B09	P01	A09	P09	
			DC5V 		B08	P02	A08	P0A	B10 A10
Circ	cuit	P0 P1	Photo coupler		B07	P03	A07	P0B	
configura	ation and	P7]			B06	P04	A06	P0C	
connect	or array	P.	Internal	\exists	B05	P05	A05	P0D	
		DC24V Com			B04	P06	A04	P0E	B1 - A1
					B03	P07	A03	P0F	
					B02	СОМ	A02 COM		ПЭП
					B01	COIVI	A01	COIVI	

(2) Compact standard type input contact point specification

Contact point	X axis	P0008 %IX0.0.8	P0009 %IX0.0.9	P0000 %IX0.0	.12	P00 %IX0	.0.13	Re	∆f
no.	Y axis	P000A %IX0.0.10	P000B %IX0.0.11	P000I %IX0.0		P00 %IX0		110	71.
Signal	name	External lower limit	External upper limit	DOG	i	НО	ME		
Rated volta		DC24\	V (DC20.4~28.8V	(-15/20%, ri	pple rate 5º	% or les	s))		
Rated curr			Abo	out 4 mA/24V	1				
Insulation	n method		Photo o	oupler insul	ation				
Input imp	oedance		About 5.6 kΩ						
On voltag	e/current		DC 19V or a	bove /3.4 mA	or above				
Off voltag	e/current		DC 6V or	less/1.1 mA	or less				
Respon		0.5	5 ms or less (when			ioning)			
Min. inp	ut width		200	μs or above No.	e Contact	No.	Contact		
				NO.	Contact	TB1	RX		
				TB2	485+	ТВ3	TX		TB1
				TB4	485-	TB5	SG	TB2	TB3
			ТВ6	P00 IX0.0.0		P01		TB5	
				TB8	P02	TB7	IX0.0.1	TB6 TB8	ТВ7
				TB10	IX0.0.2 P04	ТВ9	P03 IX0.0.3	TB10	TB9
Cinavit ass	. f i			1810	IX0.0.4 P06	TB11	P05 IX0.0.5	TB12	
Circuit cor and termi	-		DC3.31	TB12	IX0.0.6	TB13	P07	TB14	
		€ والم	Photo coupler	TB14	P08 IX0.0.8		IX0.0.7 P09	TB16	TB15
		S L		TB16	P0A	TB15	IX0.0.9	TB18	TB19
			PF) Inner cir		IX0.0.10 P0C	TB17	P0B IX0.0.11	TB20 — TE	TB21
		DC24V		TB18	IX0.0.12	TD10	P0D		TB23
				TB20	P0E	TB19	IX0.0.13	TB24	1 11
					IX0.0.14 P10	TB21	P0F IX0.0.15		
				TB22	IX0.0.16	TDOO	P11	1	
				TB24	СОМ	TB23	IX0.0.17	 	
	(DC DNIOO	C(II) there is no	actual innut noin	+ D0000C	DOOODE 14		-4.4 41-		

For XBC-DN20S(U), there is no actual input point P0000C ~ P0000F. If you want to use them, turn on by user program.

(3) Compact high end type input contact point specification

Contact point	X axis	P0008 %IX0.0.8 P000A	P0009 %IX0.0.9 P000B	%	P000C IX0.0.1 P000E	12	P00 %IX0 P00	.0.13	Ref.	
no.	Y axis	%IX0.0.10	%IX0.0.11		IX0.0.		%IX0			
Signal		External lower limit	External upper limit		DOG		НО	ME		
Rated volta		DC24V	(DC20.4~28.8V (-15/20)%, rip	ple rate 5	5% or les	s))		
Rated curr			Abo	ut 4 m/	^A /24V					
Insula metl			Photo co	upler	insulat	tion				
Input imp			About 5.6 kΩ							
O voltage/	current		DC 19V or above /3.4 mA or above							
O voltage/	current	DC 6V or less/1.1 mA or less								
Respon		0.5	ຫຣ or less (when ເ		•	it for posi	tioning)			
Min. inpi	ut width		200 /	us or	above	Contoot	No.	Contact		
					No.	Contact	TB1	RX		
			-	TB2	485+	ТВ3	TX	TB1		
			-	TB4	485- P00	TB5	SG	TB2 TB3		
			-	TB6	IX0.0.0 P02	ТВ7	P01 IX0.0.1	TB5 TB6 TB7		
			003.3	,]	TB8	B8 IX0.0.2	ТВ9	P03	TB8 TB9	
Oim.		P8 Photo coupler			TB10 P04 IX0.0.4	TB11	IX0.0.3 P05	TB10 TB11		
Circ configura	tion and	ĘF ,	PB R Photo couple		TB12	P06 IX0.0.6		IX0.0.5 P07	TB12 TB13	
termina	ıl array		PF Inner cir	cult	TB14	P08	TB13	IX0.0.7	TB16	
		DC24V			TB16	IX0.0.8 P0A	TB15	P09 IX0.0.9	TB17 TB18 TB19	
				-	1010	IX0.0.10 P0C	TB17	P0B IX0.0.11	TB20 TB21	
					TB18	IX0.0.12	TB19	P0D	TB22 TB23	
					TB20	P0E IX0.0.14		IX0.0.13 P0F	TB24	
				•	TB22	COM	TB21	IX0.0.15		
				-			TB23	24G		
					TB24	24V				

Output specification 2.3.2

(1) Modular type output contact point specification

Conta	X axis	P0020			P0022			Ref.		
ct no.	Y axis	P0021			P0023				Kei.	
Signa	al name	Pulse string output		Dire	ection ou	tput				
vol	d load tage	DC5~24V (DC	DC5~24V (DC4.75~26.4V)							
cui	t. load rrent	0.1A/1 poin	nt or b	elow						
	llation thod	Photo-couple	er insı	ulation						
Inrush	current	1A/10 ms	or be	low						
Voltage drop when On DC 0.3V or below										
Leakage when O	en Off 0.1 mA or below									
Respo	nse time	0.1 ms or below (Rated load, resistor load)								
				No.	Contact	No.	Cont act			
				B10	P20	A10	P28			
				B09	P21	A09	P29		FO-]
			ا ر	B08	P22	A08	P2A	540		
	rcuit			B07	P23	A07	P2B	B10	00	A10
	guration onnector	Internal circuit	<u>.</u>] [B06	P24	A06	P2C		0 0	
array (standard type)		P23—L		B05	P25	A05	P2D			
			247	B04	P26	A04	P2E	$\ \downarrow\ $	0 0	↓
				B03	P27	A03	P2F	B1		A1
				B02		A02	СО		ЩОГ	J
				B01	12/24V	A01	M			

Chapter 2 General Specification

(2) Compact standard type output contact point specification										
Conta ct no.	X axis	P00040 %QX0.0.0 P00041		P00042 %QX0.0 P00043	.2		Ref.			
	Y axis	%QX0.0.1		%QX0.0						
_	l name	Pulse string output		Direction or	utput					
vol	d load tage	DC5~2	4V (DC4.75~26	6.4V)						
	um load rent	(0.1A/1or less							
	lation thod	Photo	coupler insulat	tion						
Inrush	current	1.6	1A/10 ms or less							
	ge drop n On	D	DC 0.3V or less							
Leakage when Of	current	(
Respor	nse time	0.1 ms or less	(rated load, res	sistive load)						
			No.	Contact	No.	Contact				
					TB1	10100				
			TB2	PE	TB3	AC100 ~240V				
			TB4	СОМ0	103	540				
			TDC	COM 4	TB5	P40 QX0.0.0	TB1 TB3			
			TB6	COM 1	TB7	P41 QX0.0.1	TB4 TB5			
			TB8	COM 2		P42	TB6 TB7			
			TB10	P43 TB9 Q	QX0.0.2	TB10 TB9				
Cir	rcuit			QX0.0.3	TB11	Р	TB11 TB12 TB13			
	ation and al array	P20	TB12	СОМ 3	TB13	P44	TB14 TB15			
terriiri	ai airay	Inner circuit	TB14	P45 QX0.0.5	1510	QX0.0.4 P46	TB16 TB17			
		P23 L	TB16	P47	TB15	QX0.0.6	TB19			
		0012/2		QX0.0.7	TB17	NC	TB21 TB22 TB23			
			TB18	COM 4		P48	TB24			
			TB20	P49	TB19	QX0.0.8				
				QX0.0.9	TB21	P4A				
			TB22	P4B QX0.0.11	TB23	QX0.0.10				
			TB24	24G		24V				

(3) Compact high-end type output contact point specification P00020 P00022 Cont X axis %QX0.0.0 %QX0.0.2 Ref. act P00021 P00023 no. Y axis %QX0.0.1 %QX0.0.3 Signal name Pulse string output / CW output Direction output / CCW output Rated load DC5~24V (DC4.75~26.4V) voltage Maximum load 0.1A/1or less current Insulation Photo coupler insulation method Inrush current 1A/10 ms or less Voltage drop DC 0.3V or less when On Leakage current 0.1 mA or less when Off Response time 0.1 ms or les (rated load, resistive load) No. Contact No. Contact TB1 AC100 TB2 PF ~240V TB3 TB4 Ρ P20 TB1 TB5 TB2 QX0.0.0 P21 TB3 **TB6** TB4 QX0.0.1 P22 TB5 TB7 QX0.0.2 TB6 P23 TB8 TB7 QX0.0.3 TB8 COM₀ TB9 TB9 P24 TB10 **TB10** TB11 QX0.0.4 P25 TB12 **TB11** Circuit TB13 QX0.0.5 P26 TB12 TB14 configuration and ┰ QX0.0.6 P27 TB15 **TB13** terminal array **TB16** QX0.0.7 TB17 **TB14** COM1 **TB18** P28 TB19 **TB15** QX0.0.8 TB20 P29 TB16 TB21 QX0.0.9 P2A TB22 **TB17** TB23 P2B QX0.0.10 **TB24 TB18** QX0.0.11 **TB19** COM2 P2C **TB20** QX0.0.12 P2D TB21 QX0.0.13 P2E **TB22** QX0.0.14 P2F **TB23** QX0.0.15 **TB24** COM3

Output pulse level 2.3.3

Output pulse of XGB built-in positioning consists of Pulse + Direction or CW/CCW like figure below. At this time, output level of Low Active and High Active can be specified by positioning parameter and K area flag dedicated for positioning (X axis: K4871, %KX7793, Y axis: K5271, %KX8433).

			Output s	ignal level		
Pulse output type	Output signal	High Act	tive mode	Low Ac	tive mode	Reference
output typo	oigitai	Forward	Reverse	Forward	Reverse	
Pulse +	Pulse					Supported at S, H type
mode	Direction	Low	High	High	Low	at S, 11 type
cw/ccw	cw					Supported
mode	ccw					at H type

Chapter 3 Before Positioning

It describes the function of position control, operation parameter setting, operation data setting, K area for positioning, servo driver setting and programming.

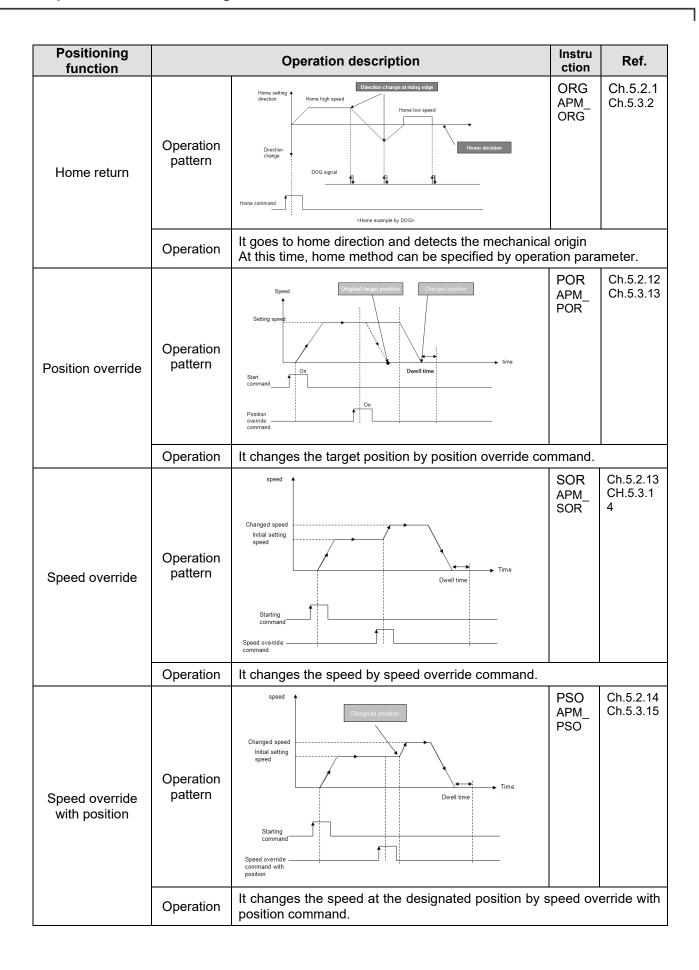
3.1 Positioning Function

3.1.1 Positioning function list

Positioning function of XGB built-in positioning is as follows. For more detail, refer to ch.5.2.

Positioning		Omeration description	lmaturation	Def
function		Operation description	Instruction	Ref.
Position control	Operation pattern	Setting speed Setting Dwell time On Start signal Complete signal	DST IST APM_DST APM_IST	Ch.5.2.3 Ch.5.2.4 Ch.5.3.4 Ch.5.3.5
	Operation	If the rising edge of start command is detected, it moves wi designated position and after dwell time, complete signal is		
Speed control	Operation pattern	Setting speed Setting speed Dwell time Time DEC. stop	DST IST APM_DST APM_IST	Ch.5.2.3 Ch.5.2.4 Ch.5.3.4 Ch.5.3.5
	Operation	If the rising edge of start command is detected, it moves and stops after deceleration by stop command. At this tim not be not on.		
speed/position switching control	Operation pattern	Speed Speed Position control Setting speed Start Signal Switchin 9	VTP APM_VTP	Ch.5.2.7 Ch.5.3.8
	Operation	Speed control is executed by start command and it is switch by switching signal and it moves to designated position.	ched to position	n control

Positioning function		Operation description	Instruction	Ref.
Position/speed switching control	Operation pattern	Speed Position Speed control pontrol Setting speed On Dwell time Time Conversion signal Dec. stop	PTV APM_PTV	Ch.5.2.8 Ch.5.3.9
	Operation	Position control is executed by start command and control by switching signal and stops after decelera		
Linear interpolation control	Operation pattern	Y axis Y incremental Y incremental Y incremental Y incremental Y incremental X axis	LIN APM_LIN	Ch.5.2.5 Ch.5.3.6
	Operation	2 axes linear interpolation control is executed b current position to target position.	y start comm	nand from
Simultaneous start	Operation pattern	X axis Setting speed Y axis Setting speed Dwell time Dwell time Time Start signal	SST APM_SST	Ch.5.2.6 Ch.5.3.7
	Operation	X axis and Y axis starts simultaneously by start con At this time, each operation data such as operation is applied to each axis.		et position
Sync start	Operation pattern	Aux. axs Dwell time Dwell time Time Start signal	SSP SSS APM_SSP APM_SSSB	Ch.5.2.10 Ch.5.2.11 Ch.5.3.11 Ch.5.3.12
	Operation	If sync start is executed by command, subsidiary a main axis' position or speed. At this time, settin ignored and operates according to the operating starts.	g of subsidia	ry axis is



3.1.2 Position control

Position control is to move the designated axis from start address (present position) up to target address (movement). There are two position control methods, absolute and incremental.

(1) Control by absolute coordinates (Absolute coordinates)

Object moves from start address to target address. Position control is performed, based on the address designated in Home Return (home address).

Direction is determined by start address and target address.

- Start address < target address: forward positioning
- Start address > target address: reverse positioning

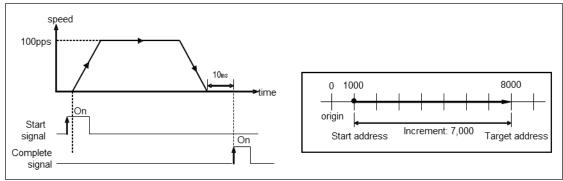
(a) example

• It assumes that operation data is specified as shown table 3-1. (For how to set operation parameter, refer to the Ch.3.3)

	Step no.	Coord.	Pattern	Control	Method	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]
I	1	ABS	END	POS	SIN	0	8,000	0	1	100	10

<Table 3-1 operation data example of absolute coordinates type>

- In table 3-1, since coordinates is 'ABS', control method is 'POS', step no. 1 is position control by absolute coordinates.
- It assumes that the current poison is 1000. Since address in step no.1 is 8000, object moves to 8000 as shown figure and increment is 8000-1000=7000. Object moves forward because target address is larger than start address.



<Figure 3-1 operation example of absolute coordinates type>

Remark

- Every position/speed control is available as long as the origin is determined preliminarily.
- If it is executed while origin is not determined, error code 234 occurs and it doesn't move.
- In case error occurs, refer to App.1.2 and remove the cause of error.
- · Complete signal is on during one scan.

(2) Control by incremental coordinates

Object moves from current position as far as the address set in operation data. At this time, target address is based on start address. Direction is determined by sign (+,-).

- In case Address is positive number: forward positioning (Direction increasing address)
- In case Address is negative number: reverse positioning (Direction decreasing address)

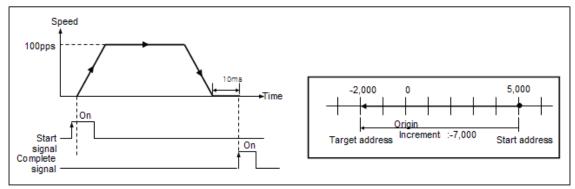
(a) Example

• It assumes that operation data is specified as shown table 3-2. (For how to set operation parameter, refer to the Ch.3.3)

	Step no.	Coord.	Pattern	Control	Method	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]
ĺ	1	INC	END	POS	SIN	0	-7,000	0	1	100	10

<a>Table 3-2 operation data example of incremental coordinates type>

- In table 3-1, since coordinates is 'INC', control method is 'POS', step no. 1 is position control by incremental coordinates.
- It assumes that current position is 5000. Since object moves as long as -7000, target stop at -2000 (absolute coordinates) as shown figure 3-2. At this time, increment is -7000 pulse and direction is reverse.



< Figure 3-2 operation example of incremental coordinates type>

3.1.3 Speed control

- Speed control means that object moves with steady speed (steady pulse string) until stop command.
- In case of speed control, direction is determined by sign of Address set in operation data.

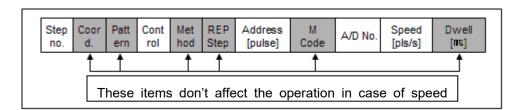
Forward : Address is positive number

Reverse: Address is negative number

In the speed control, direction is determined by sign of target address regardless of current position and target position.

For example, current position is 100 and target position is 90, though target position is less than current position, since sign is positive, it moves forward.

• In case of speed control, some items as figure below doesn't affect the operation.



- If Control is specified as SPD, coordinates, pattern, method, M code, dwell time doesn't affect the operation.
- So in case of speed control, when object stops by STP command, it stops without dwell time and M code doesn't operate.

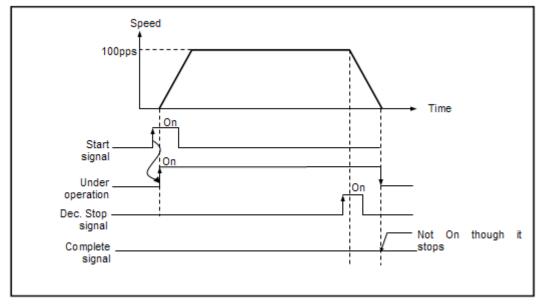
(1) Example

It assumes that operation data is specified as shown table 3-3

Step no.	Coord	Pattern	Contr ol	Metho d	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]
1	INC	END	SPD	SIN	0	10	10	1	100	10

<Table 3-3 operation data example of speed control>

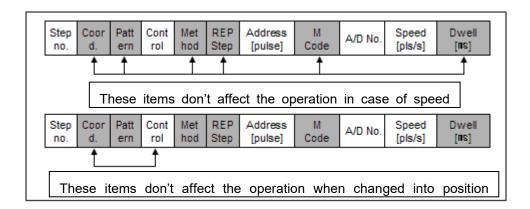
- In table 3-3, since Control is 'SPD', step no. 1 is operation data of speed control.
- Since Address is positive number and Speed is 100, target moves forward with 100 pls/s speed regardless of current position until stop command (DEC. stop or EMG stop).
- If object moves, flag (X axis: K4200, %KX6720, Y axis: K4300, %KX6880) is on. And if DEC. stop command is executed, it stops after deceleration without dwell time and flag turns off immediately.
- At this time, deceleration time conforms to that in operation data, not operand of instruction.



< Figure 3-3 Operation of speed control >

3.1.4 Speed/position switching control

- It change speed control to position control by switching command (VTP instruction).
- In case of speed/position switching control, items affecting the operation are different according to control method.



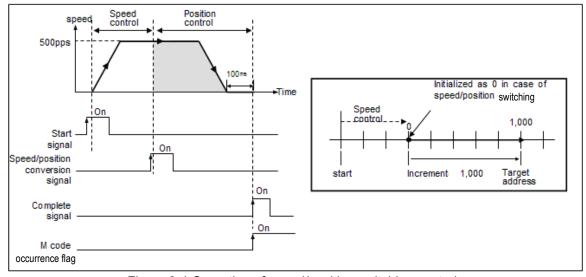
- First, object moves by speed control. If speed/position switching control is executed, target will move by position control.
- At this time, position control is executed by absolute coordinates with initializing the current position as 0. So coordinates item doesn't affect the operation.
- Since control method also changes by speed/position switching, control method in the operation data doesn't affect the operation.
- In case of speed/position switching, object keeps its previous direction.

(1) Example

It assumes that operation data is specified as shown table 3-4.

Step no.	Coord	Pattern	Contr ol	Metho d	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]
1	INC	END	SPD	SIN	0	1000	11	1	500	100

<Table 3-4 operation data example of speed/position switching control>



< Figure 3-4 Operation of speed/position switching control >

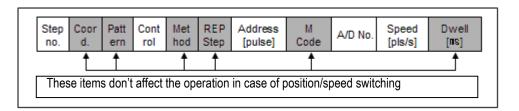
- If step no. 1 in table 3-4 starts, object moves forward by speed control because Control is SPD and Address is positive number.
- If speed/position switching command (VTP instruction) is executed during speed control, current position will be initialized as 0 and object moves by position control until 1000.
- If object reaches target position, complete flag and M code occurrence flag will be on after dwell time. At this time, M code number 11 is displayed as set in operation data.
- Positioning complete flag will be on during one scan and M code occurrence flag keeps on status, until it is turned off by off command.

Remark

- M code occurrence flag is turned off by MOF instruction.
- Using MOF instruction, M code occurrence flag and M code number will be clear simultaneously.
- Speed/position switching command is executed only when each axis is operating. If it is executed during stop, it may cause error.
- If position/speed switching command is executed during operation by speed control, the command is ignored. But at this time, error is not occurred.

3.1.5 Position/speed switching control

- It change position control to speed control by switching command (VTP instruction).
- In case of position/speed switching control, items affecting the operation are different according to control method. In case position control, all items affect the operation but in case of speed, some items affect the operation as shown below.



- First, object moves by position control. If position/speed switching control is executed, object will
 move by speed control. At this time, the current position is not initialized. Only control method
 changes into speed control and it continues operation
- When control method changes, some items in operation data doesn't affect the operation.

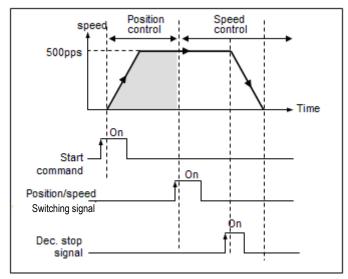
(1) Example

It assumes that operation data is specified as shown table 3-5.

Step no.	Coord	Pattern	Contr ol	Metho d	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]
1	INC	END	POS	SIN	0	10000	12	1	500	100

< Table 3-5 operation data example of position/speed switching control >

- If step no. 1 in table 3-5 starts, object moves by position control according to operation data in table 3-5 because Control is POS.
- If position/speed switching command (VTP instruction) is executed during position control, object moves by speed control until stop command.
- If object stops by stop command, it will stop without dwell time and positioning complete flag will not be on.



<Figure 3-5 Operation of position/speed switching control>

Remark

- Position/speed switching command is executed only when each axis is operating. If it is executed during stop, it may cause error.
- If speed/position switching command is executed during operation by position control, the command is ignored and causes error. But at this time, positioning doesn't stop.

3.1.6 Linear interpolation control

Object moves by linear interpolation control from start address to target address using two axes, X,
 Y. There are two method in linear interpolation control, absolute coordinates and incremental coordinates.

(1) Control by absolute coordinates

When linear interpolation control is executed, object moves based on the origin designated by Home return.

Direction is determined by start address and target address for each axis.

- start address < target address: Forward
- start address > target address: Reverse

(a) How to set operation data

In the linear interpolation control, since two axes operates simultaneously, it needs attention The following is notice when setting the operation data.

1) Determining main axis

 For linear interpolation, first you have to determine the main axis. In the XGB built-in positioning, main axis is determined automatically. The one which has a large moving amount becomes main axis.

2) Determining control method

 In the linear interpolation operation, control methods of both axes should be specified as "position". If not, error will occur and it will not be executed.

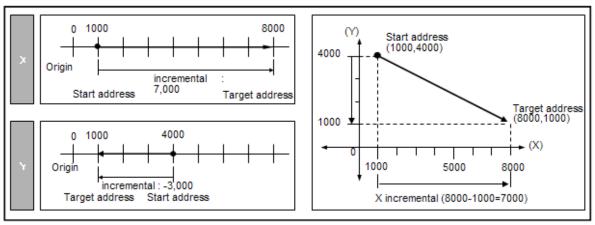
- 3) Setting of operation pattern
 - In case of main axis, operation pattern should be specified as 'END' or 'KEEP'. In case it is specified as 'CONT', it operates as 'KEEP'.
 - In case of subsidiary, pattern doesn't affect the operation, it operates according to main axis pattern.

(b) Example

It assumes that operation data is specified as shown table 3-6 and current position are X=1000, Y=4000.

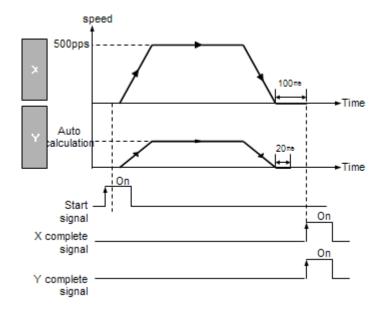
Step no.	Coord.	Pattern	Control	Method	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]	Step no.
Х	1	ABS	END	POS	SIN	0	8000	0	0	500	100
Υ	1	ABS	KEEP	POS	REP	3	1000	0	0	2000	20

<Table 3-6 operation data example of linear interpolation control by absolute coordinates>



< Figure 3-6 linear interpolation operation by absolute coordinates >

- If linear interpolation starts, main axis is determined automatically based on moving amount of X and Y axis. In table 3-6, since moving amount of X axis is larger than Y axis X, X axis becomes main axis.
- · So operation pattern, speed, A/D number, dwell time of Y axis is ignored and it is specified automatically according to operation data of X axis.
- Figure 3-7 indicates operation of linear interpolation control.



< Figure 3-7 operation of linear interpolation control >

(2) Control by incremental coordinates

It executes the linear interpolation control based on current position by incremental coordinates. At this time, Address of operation data means how long object moves from current position. Direction is determined sign of Address.

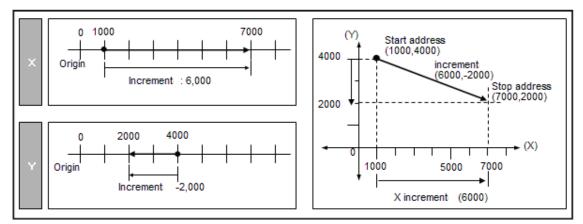
- In case Address is positive number: forward
- In case Address is negative number: backward

(a) Example

• It assumes that operation data is specified as shown table 3-7 and current position are X=1000 , Y=4000.

Step no.	Coord.	Pattern	Control	Metho d	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]	Step no.
Х	1	INC	END	POS	SIN	0	6000	0	0	500	100
Υ	1	INC	KEEP	POS	REP	3	-2000	0	0	2000	20

< Table 3-7 operation data example of linear interpolation control by absolute coordinates >



< Figure 3-8 linear interpolation operation by absolute coordinates >

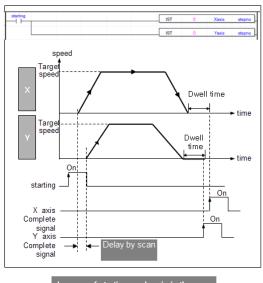
- If linear interpolation is executed, main axis is determined according to moving amount of X and Y axis. In table 3-7, since moving amount of X axis is larger than Y, X axis becomes main axis.
- So subsidiary Y axis operation pattern, operation speed, ACC/DEC time, dwell time do not affect the operation and recalculated according to operation data of main axis. For example, if you execute the linear interpolation control with operation data such as table 3-7, subsidiary Y axis starts as END, SINGLE operation and operates with automatically calculated ACC/DEC speed and operation speed, as for Dwell time after stop, 100ms, dwell time of main axis X is applied. not 20ms, setting value.

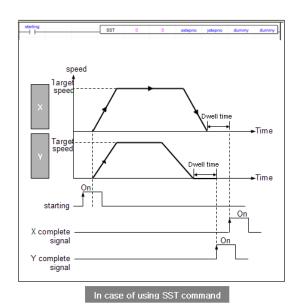
Remark

- A special attention should be paid that linear interpolation start operates on 2 axes simultaneously.
- · Pattern of main axis can specified as 'END', 'KEEP'. If it is specified as 'CONT', object moves as it is 'KEEP'.
- · Available commands during linear interpolation are DEC. STOP, EMG. STOP.
- · During linear interpolation operation, position/speed switching control, speed override, position override, speed override with position, If those are executed during liner interpolation operation, it may cause error.
- Operation method, operation pattern, speed limit, dwell time is specified as that of main axis.
- · Speed, acceleration/deceleration time, bias speed of subsidiary axis is calculated again automatically.
- Backlash compensation amount, SW upper/lower limit is specified as it is for each axis.

3.1.7 Simultaneous start control

- It starts each step for each axis simultaneously by simultaneous start control (SST instruction).
- If SST instruction is used, it can remove delay of start caused by scan time delay.





In case of starting each axis in the

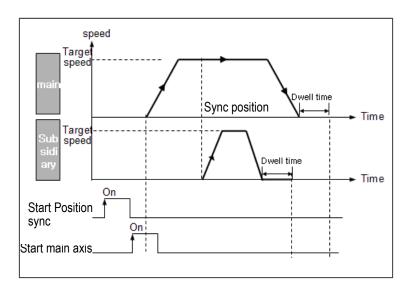
 SST instruction can be executed when two axes stop. If SST instruction is executed again after stop, in case of incremental coordinates, the current position is initialized as 0.

3.1.8 Sync control

•In sync control, position or speed of subsidiary axis is synchronized with that of main axis. There are two types in sync control, speed sync control and position sync control.

(1) Position sync control

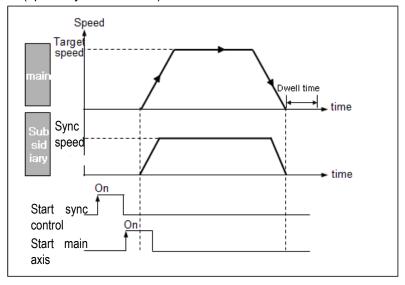
• Position sync control means starting the operation step of subsidiary at the time when position of main axis is same with position set in SSP instruction (Sync control)



- Position sync control can be executed when origin of both axes is determined. When executing
 the SSP instruction, if origin of main axis is not determined, error code 346 occurs and for
 subsidiary axis, error code 344.
- When using SST instruction, specify the main axis to be different with subsidiary axis. If not, error code 347 will occur.
- If synch control is executed, though pulse is not yielded until main axis goes to designated axis, flag indicating whether subsidiary axis moves or not, turns on (X axis: K4200, %KX6720, Y axis: K4300, %KX6880).
- After executing position sync control, if the user wants to cancel the execution of position sync control, execute the STP instruction (stop command).

(2) Speed sync control

• If main axis starts as figure below, subsidiary axis moves with speed of sync speed rate set in the SSS instruction (speed sync command).



- It can be executed when origin of subsidiary axis is not determined.
- · Since subsidiary axis moves according to speed of main axis, whether main axis moves by speed control or position control doesn't matter. At this time, direction of subsidiary axis is same as that of main axis.
- · When sync control is executed and main axis stops, though pulse is not outputted, flag indicating whether subsidiary axis moves or not, turns on (X axis: K4200, %KX6720, Y axis: K4300, %KX6880).
- In case of speed synch control, sync speed rate is 0.00% ~ 100.00%. If it is out of range, error code 356 occurs.
- After executing speed sync control, if the user wants to cancel the execution of speed sync control, execute the STP instruction (stop command).
- When executing speed sync control, if M code is on, error code 353 will occur.
- The user can set X axis, Y axis, channel 0~3 of High speed counter as main axis in the speed sync control. For more detail, refer to Ch.5.2.12.

3.1.9 Home return

· Home return is used to fine mechanical origin when starting machine. Home return is executed according to home parameter for each axis. In home parameter, items affecting homing are as follows. (For setting of each parameter, refer to Ch.3.2)

Туре	Items	Description	-
	Home Method	Setting home method	
	Home Direction	Start direction when homing	
	Home Address	Origin address when detecting origin	
Home parameter	Home High/Low speed	High/Low speed when homing	
'	Homing ACC/DEC Time	ACC/DEC time when homing	
	DWELL time	Time required to remove offset pulse of remaining bias counter immediately after positioning ends	

When origin is determined by homing, though the user inputs homing signal and DOG signal, those are ignored.

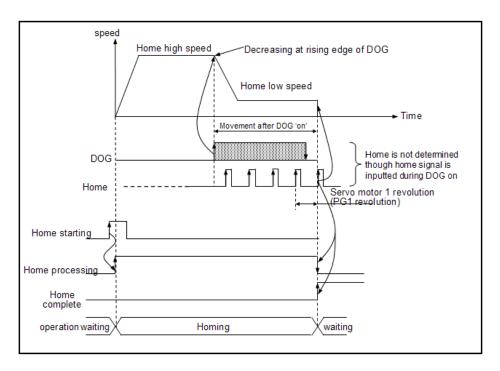
(1) Type of Home method

Generally, home method can be divided into one using DOG and another not using DOG. In the XGB built-in positioning, there are three methods using DOG.

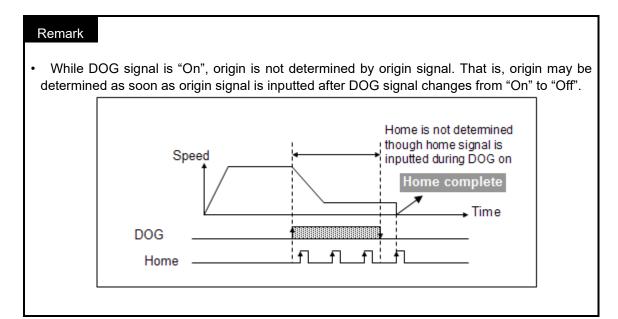
Home method	Necessary input signal	Reference
Origin detection after DOG off (0: DOG/HOME(OFF))	DOG, Origin	
Origin detection after DEC. when DOG on (1: DOG/HOME(On))	DOG, Origin	Content of () is displayed in the Home Parameter of XG5000.
Origin detection by DOG (2: DOG)	DOG	

(2) Origin detection after DOG Off

The operations by Home Return instruction using DOG and origin signal are as follows.

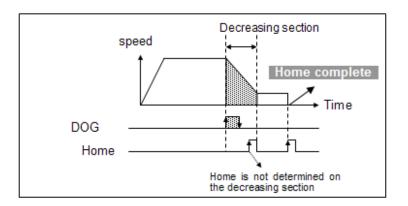


- (a) If home return command (ORG instruction) is executed, it accelerates toward a preset home return direction and with Home high speed.
- (b) During operating with Home Return High speed, if rising edge of DOG signal occurs, it operates with Home Return Low speed and monitors if there is falling edge of DOG signal. At this time, though Origin signal is inputted while DOG signal is On, Origin is not determined.
- (c) If first origin signal is entered after DOG signal changes from "On" to "Off", it stops.

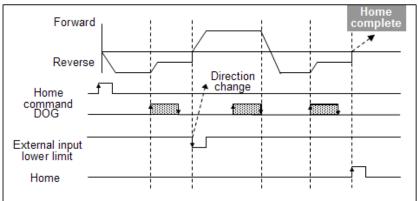


Remark

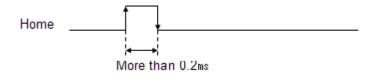
· In speed-decreasing section, origin is not determined. Though DOG changed from "On" to "Off" and Origin signal is inputted in speed-decreasing section, origin is not determined. Origin is determined at first Origin signal after speed-decreasing section



 It operates as follows if it meets an external lower limit while waiting for origin entry after DOG signal changes Off->On->Off. (The following figure is example when home direction is backward)

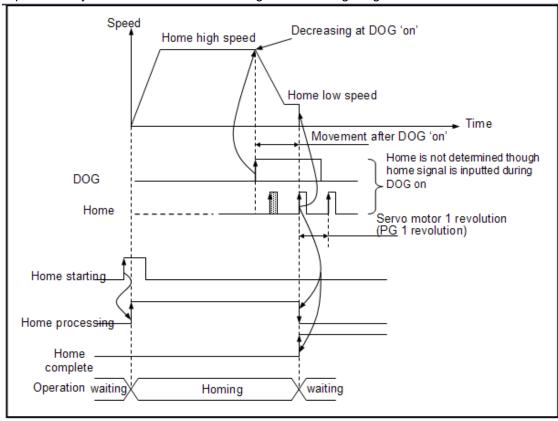


- (1) If object starts home return backward by homing command and meets rising edge of DOG, it changes homing with slow speed and if it meets falling edge again, it waits to determine the origin at the first origin signal.
- (2) At this status, if external low limit input signal (B contact point) is entered, target changes the direction and homing forward with high speed.
- (3) At the moment when target meets rising edge of DOG again and falling edge, target changes the direction to backward and repeats step (1), if origin signal is entered, origin is determined.
- X During homing, if external input upper or lower limit is entered, object changes direction promptly without deceleration section. When stepping motor is used, this may cause out of operation. So be careful.
 - If 'On' time of origin input signal is very short, XGB may not recognize the input signal. So 'On' time of origin should be larger than 0.2ms.



(3) Origin detection after deceleration with DOG set "On"





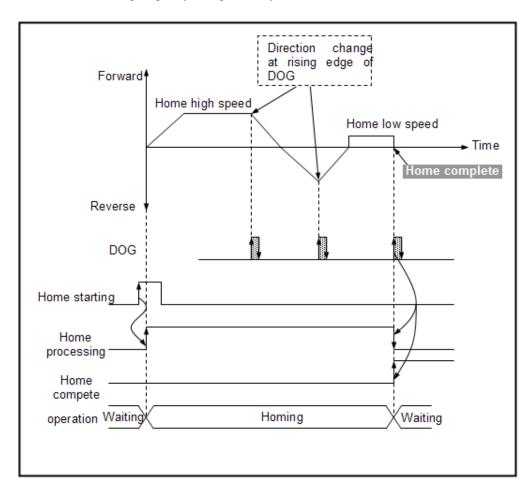
- (a) If homing command(ORG instruction) is executed, it accelerates toward a set home direction and operates at home high speed.
- (b) At the moment, if an external entry, DOG signal is entered, it decelerates and operates at home return low speed.
- (c) Origin is determined and it stops if it meets an external entry, origin signal with DOG set "On" while it operates at home return low speed.

Remark

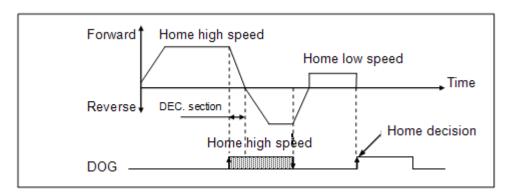
- Origin is determined if origin signal is entered with DOG set "On" as long as home return speed is operating at low speed from high speed via decelerating section with DOG signal set "On". That is, when home return speed is decelerating, origin is not determined by origin
- · If it meets external upper/lower limit signal prior to origin after DOG signal is changed from "Off" to "On", it works backward direction.

(4) Origin detection by DOG

It is used when determining origin by using the only DOG.



- (a) If homing command (ORG instruction) is executed, it accelerates to home direction set in Home Parameter and it homes with high speed.
 - (The above figure is example when homing direction is forward)
- (b) While target is homing with high speed, if rising edge of DOG occurs, target speed decreases and change its direction.
- (c) When it accelerates after changing direction, if rising edge of DOG occurs, it homes with low
- (d) In the homing status with low speed, rising edge occurs of DOG third time, it stops and determines the origin.
- (e) When 'On' time of DOG signal is larger decreasing time, it changes the direction at the falling edge of DOG and moves with low speed and stops at the rising edge of DOG and determines the origin.

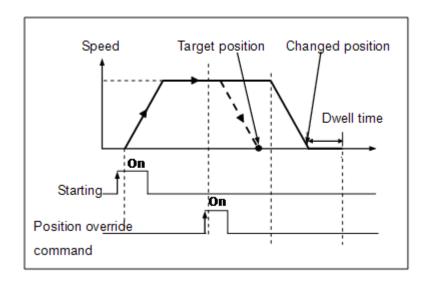


3.1.10 Position and speed override

Override means changing target address or speed without stop during positioning.
 The XGB positioning provides three type of override, position override, speed override, speed override with position.

(1) Position override

If changing a target position during positioning operation with positioning data, it may be changed by using position override command (POR instruction).



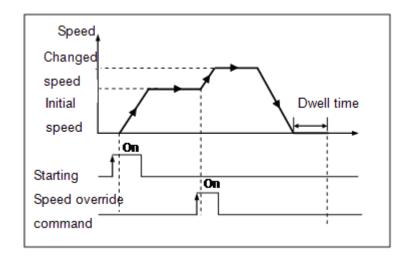
- When using position override, be careful the followings.
- (a) That is, if passing a position to change during operation, it decelerates, stops and keeps positioning operation by the subsequent operation pattern; if not passing a position, it starts positioning operation as taking a Incremental position as much as override set in the start point of the step of position override instruction.
 - (Ex.) It assumes that current location is 20,000 and operation data is specified as table below. (It assumes that position override amount is 15,000)

Ste	Coord.	Pattern	Contr ol	Metho d	Rep step	Address [Pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]
3	ABS	END	POS	SIN	0	40,000	0	0	500	100

- 1) If operation step 3 starts, target moves to 40,000 by absolute coordinates forward.
- 2) If override is executed at the time current position is 30,000 during operation, since it doesn't pass 15,000 based on operation start point 20,000 target position changes 35000 (20,000+15,000).
- 3) If override is executed at the time current position is 38,000 during operation, since it passes 15,000 based on operation start point 20,000, target speed decreases and stops.
- (b) Position override command is available in the ACC., KEEP, DEC. section among operation pattern. If position override command is executed during dwell, error code 362 occurs.
- (c) In case operation pattern is set as CONT, override is executed based on start position of operation step used at this time.
- (d) Position override ranges -2,147,483,648 ~ 2,147,483,647 Pulse.

(2) Speed override

While positioning by operation data, it is used to change operation speed by speed override command (SOR instruction).



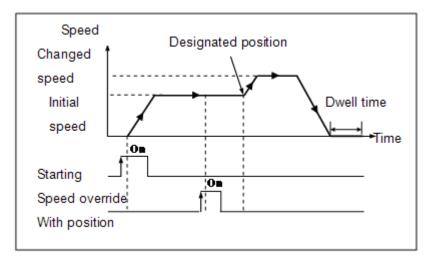
- · Speed override command is available during acceleration, constant speed operation section and executing speed override instruction in deceleration section during operation or dwell section may cause Error 377 but the operation continues.
- Speed override setting ranges 1~100,000pps (setting unit: 1pps).

Remark

- Note that if a sudden difference between the current speed used for operation and a new speed newly changed by speed override is excessive, it may cause a Step-over.
- During speed override, if target speed is smaller than bias speed. it will be operate by bias speed.

(3) Speed override with position

Positioning speed override instruction changes its speed and keeps operating once it reaches the set position during positioning operation by using speed override with position (PSO instruction).



Positioning speed override instruction is available only in acceleration and regular speed sections among operation patterns while the available operation modes are end operation, continuous operation and sequential operation.

3.1.11 Positioning stop signal

- (1) Stop instruction and stop factors
- Stop instructions and factors are summarized as follows and divided into individual stop and simultaneous stop.
 - Individual axis stop instructions or the stop factors affect the only axis (axes) of which stop instruction is "On" or stop factor exists. However, interpolation control operation axis stops if an axis is with stop instruction or stop factor during linear/circular interpolation.

Operation status Stop factor		Positioning *1	Home *2	Jog operation	Axis operation status after stop instruction *3	M code "On" Signal status
Stop by	Excess of soft upper limit	Immediate stop	Not detected	Immediate stop	Error status (Error 501)	No change
parameter setting ^{*4}	Excess of soft lower limit	Immediate stop	Not detected	Immediate stop	Error status (Error 502)	No change
Stop by	Dec. stop instruction	Dec. stop	Dec. stop	Error 322 (keep running) Decelerating		No change
sequence program ^{*5}	Emergency stop instruction	Immediate stop			Error status (Error 481) No output	Off
Stop by	External upper limit "On"	Immedi	ate stop	Forward immediate stop	Error status (Error 492)*6	No change
external signal	External lower limit "On"	Immediate stop		Backward immediate stop	Error status (Error 493) ^{*6}	No change
Stop by monitoring package	Dec. stop instruction	Immediate stop	Immediate stop	Error 322 (keep running)	Stopping	No change

Remark

- *1: Positioning refers to position control, speed control, position/speed switching control and speed/position switching position by positioning data.
- *2: If Home Return is complete, DOG and Home Signal, which are external input signals, do not affect positioning control.
- *3: If axial operation is 'no output' after being stopped, run a instruction to cancel 'No Output'. Then, No output is cancelled and error number is reset.
- *4: Soft upper/lower limits by parameters are unavailable in speed control operation mode.
- *5: Sequence program refers to XGB program method.
- *6: Error 495 may occur depending on a rotation direction.

(2) Stop Process and Priority

(a) Stop Process

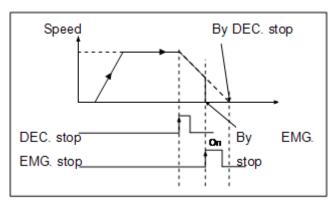
- Since positioning operation is not complete if it stops due to deceleration stop instruction, After Mode among M code modes is not "On" because it does not generate positioning completion
- After then, if indirect start instruction (step number = current step number) is generated, Absolute method operation operates as much as the remaining distance of the current operation step yet output while Incremental method operation operates as much as the target distance.
- (b) Process of emergency stop and external input upper/lower limits
 - If emergency stop instruction or external input upper/lower limits are input during positioning control, it stops positioning control and turns 'No output', generating an error.
- (c) Stop process priority

The priority of positioning module stop process is as follows.

Decelerating stop < Immediate stop

Remark

In case of any immediate stop factor during decelerating stop, it processes as follow.



Immediate stop factors: ①internal emergency stop, ②external input upper/lower limit, ③ Soft upper/lower limits

(d) Interpolation stop

- It decelerates and stops if it meets a stop instruction during interpolation operation.
- If indirect start instruction is executed in the current step when re-starting after decelerating stop, it resumes operating the positioning operation data to the target position. At the moment, it operates differently depending on absolute coordinate and Incremental coordinate.

(e) Emergency stop

- · It immediately stops if meeting emergency stop while performing start-related instructions (indirect start, direct start, simultaneous start, synchronic start, linear interpolation start, Home Return start, jog start and inching start).
- Internal emergency stop generates Error 481.
- · Since it is subject to no output and un-defined origin once emergency stop is executed, it may run

positioning operation after executing origin determination (Home Return, floating origin and the current position preset) in case it is operated with absolute coordinate or in determined origin.

3.1.12 Manual operation

In general, manual operations refer to jog operation, inching operation which don't use operation data.

(1) Jog operation

 Jog operation means positioning by jog operation stat contact point or positioning monitoring package.

Classification		Jog forward start		Jog high speed/low speed	
X axis	XBM/XBC	K4291	K4292	K4293	
	XEC	%KX6865	%KX6866	%KX6867	
Y axis	XBM/XBC	K4391	K4392	K4393	
	XEC	%KX7025	%KX7026	%KX7027	

- It is operated by jog speed set in positioning parameter.
- It can be executed when origin is not determined.
- Acceleration/deceleration process is controlled by the duration set in jog acceleration/deceleration time among parameter settings of this software package.
- If jog speed is set out of allowable range, it generates an error and operation is not available

	High speed jog operation	1 ~ 100,000	
Range	Low speed jog operation	1 ∼ jog high speed	(Unit: 1pps)

Remark

· Make sure to follow the cautions

Bias speed \leq Jog high speed \leq Speed limit

(2) Inching operation

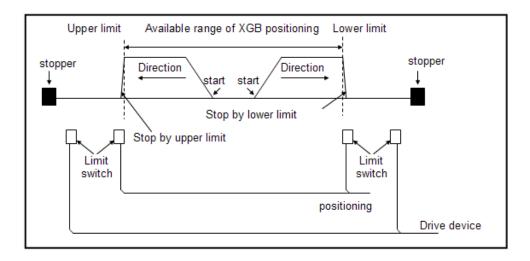
- As one of manual operations, it outputs as much as pulse set at the speed for origin/manual parameter inching speed.
- While operation by jog instruction may not exactly move to the start/end points, inching instruction
 may easily reach to a target point as much as desirable distance. Therefore, it is probable to move
 close to an operation position by jog instruction and then move to an exact target position by
 inching operation instruction.
- The available range is between $-2,147,483,648 \sim 2,147,483,647$ Pulse.

3.1.13 Stroke Upper/Lower Limits

Positioning is subject to external input stroke limit (external input upper limit, external input lower limit) and software stroke limit (software upper limit, software lower limit).

(1) External input stroke upper/lower limits

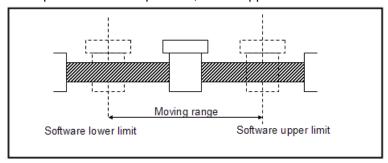
- External input stroke limit is an external input connector of positioning; external input upper limit/external input lower limit.
- It is used to immediately stop a positioning module before reaching to stroke limit/stroke end by setting up stroke limits of positioning module inside stroke limit/stroke end of drives. At the moment, if exceeding upper limit, it generates Error 492 while if exceeding lower limit, it generates Error 493.



- Note that positioning operation is not available if it stops out of positioning range.
 If it stops due to external input stroke limit detection, move it into the controllable range of positioning by manual operation (jog operation, inching operation, manual pulse generator operation).
- External input stroke upper/lower limit error is detected by edge during positioning, so manual operation is available although it exceeds stroke range.

(2) Stroke upper/lower limits

- Stroke upper/lower limit function does not execute positioning operation if it is operated out of ranges of stroke upper/lower limits, which are set in positioning parameters.
- When it starts operation or is in operation, stroke upper/lower limits are checked.

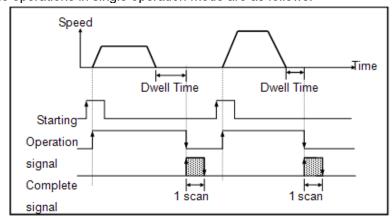


Remark

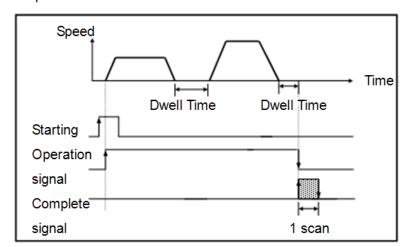
Software stroke upper/lower limits are not detected unless origin is determined.

3.1.14 Output of positioning completion signal

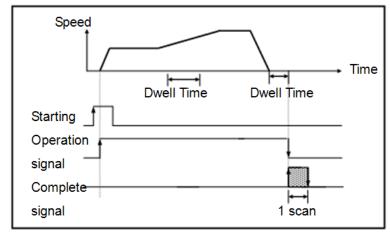
- Regarding positioning completion output time, the completion signal(X axis: 4202, %KX6722, Y axis: K4302, %KX6882) is on and it turns off after 'on' is maintained as much as 1 scan time after positioning is completed during single operation, repeat operation, continuous operation, sequential operation, linear interpolation operation, speed/position switching operation (with position indicated during constant speed operation) and inching operation.
- In case operation pattern is KEEP or CONT, positioning completion signal is yielded when operation pattern stops completely.
- The operations in single operation mode are as follows.



The operations in continuous mode are as follows.



· The operations in sequential operation mode are as follows.

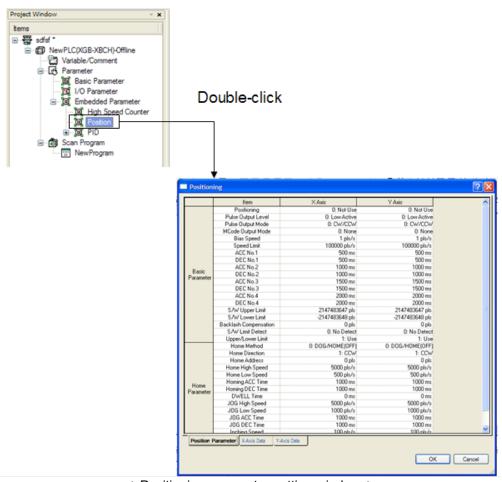


3.2 Positioning Parameter

It describes positioning parameter and operation data setting.

3.2.1 Positioning parameter setting sequence

- Positioning parameter can be set more than V1.2 (high end type can be set more than XG5000 V2.2) and it has the following sequence. (This manual is described by using XG5000 V2.2.)
- (1) Opening parameter setting window
 - Select [Parameter] -> [Embedded Parameter] -> [Positioning] and double-click to open positioning parameter setting window. (If project is not displayed, press [View] -> [Project Window] to open project window [shortcut key: ALT + 1]



< Positioning parameter setting window >

Chapter 3 Before Positioning

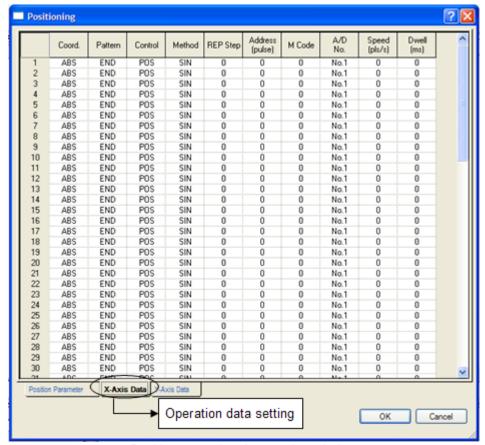
(2) Setting parameter

- Positioning parameter setting window is classified into basic parameter and Home parameter.
- Each item can be set independently.
- For detail setting of basic parameter, refer to 3.2.3.
- For detail setting of Home parameter, refer to 3.2.4.

Туре	Item	Description				
	Positioning	Set whether to use positioning function.				
	Pulse output level	Set pulse output mode (Low/High Active).				
	Bias speed	Set the initial start speed for early operation.				
	Speed limit	Set the max speed settable in positioning operation.				
	ACC/DEC No.1	Time setting of ACC/DEC section No.1				
	ACC/DEC No.2	Time setting of ACC/DEC section No.2				
	ACC/DEC No.3	Time setting of ACC/DEC section No.3				
Pagia parametera	ACC/DEC No.4	Time setting of ACC/DEC section No.4				
Basic parameters	S/W upper limit	Set upper limit within a machine's operation range				
	S/W lower limit	Set lower limit within a machine's operation range				
	Backlash compensation	Set compensation amount of tolerance in which a machine is not operated due				
	amount	to wear when rotation direction is changed.				
	S/W upper/lower limits	Set whether to detect or not SAM unper/lewer limits during constant appeal				
	during constant speed	Set whether to detect or not S/W upper/lower limits during constant speed operation				
	operation					
	Use upper/lower limits	Use or not				
	Home Return method	Set home return method				
	Home Return direction	Set home return direction				
	Origin address	Set origin address				
	Origin compensation amount	Set origin compensation amount				
	Home Return high speed	Set high speed for home return				
	Home Return low speed	Set low speed for home return				
	Home Return accelerating					
Origin/Manual	time	Set accelerating time for home return				
Origin/Manual	Home Return decelerating					
parameters	time	Set decelerating time for home return				
	Dwell time	Set a time required to remove remaining bias counter immediately after				
	Dwell tillle	positioning ends				
	Jog high speed	Set high speed for jog operation				
	Jog low speed	Set low speed for jog operation				
	Jog accelerating time	Set accelerating time for jog operation				
	Jog decelerating time	Set decelerating time for jog operation				
	Inching speed	Set speed for inching operation				

(3) Operation data setting

- If the user select 'X Axis Data' or 'Y Axis Data' tap on the positioning parameter setting window, the user can set operation data of 30 steps as show below.
- Standard type can set up to 30 steps, high-end type can set up to 80 steps.



< Position operation data setting window >

- •Items of operation data is as table below.
- •For detail of operation data, refer to 3.3.

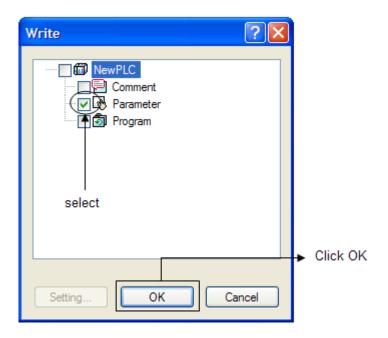
Item	Description	Initial value
Coord.	Setting Cood. of each step (ABS/INC)	ABS
Pattern	Setting operation pattern of each step (END/KEEP/CONT)	END
Control	Setting control method of each step (POS/SPD)	POS
Method	Setting operation method of each step (SIN/REP)	SIN
REP step	In case of repeated operation, setting the next step no.	0
Address	Setting target address of each step	0[Pulse]
M Code	In case of using M code, number indicated when M code occurred (In case of setting as 0, M code function is not used)	0
A/D No.	Setting A/D no. of each step	No.1
Speed	Operation speed of each step	0[pps]
Dwell	After ending step, time necessary to remove remaining pulse of offset counter	0[ms]

Chapter 3 Before Positioning

(4) Writing to PLC

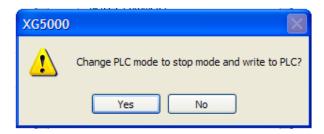
- •After setting of positioning parameter and operation data per each axis, download them to PLC
- •Selecting [Online] -> [Write], 'Write' dialog box is displayed.

In order to download parameter, select 'Parameter' and click 'OK'.



Remark

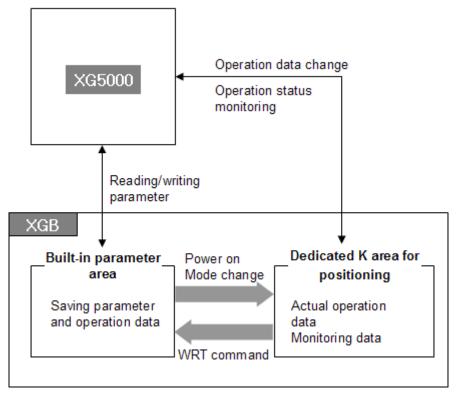
- If XG5000 is not connected with PLC, 'Write' menu is not activated. In case of this, select [Online] -> [Connect] to connect with PLC.
- When PLC is RUN mode, comment is available to download so only comment is displayed in the 'Write' dialog box. At this time, change PLC's mode to STOP and retry it.



- If downloading parameter, basic parameter, I/O parameter, built-in parameter is transmitted.
- The downloaded positioning parameter is applied when turning on the power or changing operation mode. For more detail, refer to 3.2.2.

3.2.2 Relationship between positioning parameter and dedicated K area

XGB built-in positioning function executes the positioning control by using parameter and K area dedicated for positioning. Here describes relationship between positioning parameter and K area. Internal memory configuration related with XGB built-in positioning is as follows.



< Relationship between positioning parameter and K area >

- •XGB has a built-in parameter area to save operation data and parameter written in the XG5000 and a dedicated K area for use of real positioning operation.
- •If writing the embedded positioning parameter and operation data, the downloaded data is saved in the built-in parameter area permanently. And in case of reading, it reads built-in parameter area.
- •XGB executes the initialization by copying the parameter and operation data saved in the built-in parameter area to K area dedicated for positioning.
 - (1) In case of restarting after power cut
 - (2) In case of changing PLC operation mode
 - (3) In case of restarting PLC by reset command
- •XGB built-in positioning is executed by using data of K area and Flags that indicate the current operation status and monitoring data are displayed in the K area. So the user can change operation data easily by changing the K area data
- •In order to preserve the current K area data, K area data should be applied to built-in parameter area by using application command (WRT command)
- •For detail list of K area, refer to A2.2.

Remark

- •After changing K area and not using WRT instruction, if restarting after power cut or changing PLC operation mode, K area is initialized.
- •For more detail of WRT instruction, refer to 5.2.21.

3.2.3 Setting basic positioning parameters

It describes the range of setting basic parameters and special K area for positioning.

			K area for			
			X-axis	Y-axis	Data size	
Item	Range	Initial value	XBM/XBC	XBM/XBC		
			XEC	XEC		
Positioning	0: No use, 1 : use	0	K4870 %KX7792	K5270 %KX8432	Bit	
Pulse output	0 : Low Active,	0	K4871	K5271	Bit	
level Pulse output	1 : High Active 0 : CW/CCW	0	%KX7793 K4873	%KX8433 K5273	Bit	
mode M code output	1 : PLS/DIR 0 : NONE, 1 : WITH	0	%KX7795 K4681-2	%KX8435 K5081-2	Bit	
mode	2 : AFTER	0	%KX7489-90	%KX8129-30		
Bias speed	1 ~ 100,000[pulse/ sec]	1	K450 %KD225	K490 %KD245	Double word	
Speed limit	1 ~ 100,000[pulse/ sec]	100,000	K452 %KD226	K492 %KD246	Double word	
ACC time 1	0 ~ 10,000[unit: ms]	500	K454	K494	word	
DEC time 1	0 ~ 10,000[unit: ms]	500	%KW454 K455	%KW494 K495	word	
ACC time 2	0 ~ 10,000[unit: ms]	1,000	%KW455 K456	%KW495 K496 %KW496	word	
DEC time 2	0 ~ 10,000[unit: ms]	1,000	%KW456 K457 %KW457	K497 %KW497	word	
ACC time 3	0 ~ 10,000[unit: ms]	1,500	K458 %KW458	K498 %KW498	word	
DEC time 3	0 ~ 10,000[unit: ms]	1,500	K459 %KW459	K499 %KW499	word	
ACC time 4	0 ~ 10,000[unit: ms]	2,000	K460 %KW460	K500 %KW500	word	
DEC time 4	0 ~ 10,000[unit: ms]	2,000	K461 %KW461	K501 %KW501	word	
S/W upper limit	-2,147,483,648 ~ 2,147,483,647 [pulse]	2,147,483,647	K462 %KD231	K502 %KD251	Double word	
S/W lower limit	-2,147,483,648 ~ 2,147,483,647 [pulse]	-2,147,483,648	K464 %KD232	K504 %KD252	Double word	
Backlash Compensation	Backlash 0 × 65 535[pulse]		K466 %KW466	K506 %KW506	word	
S/W Limit Detect	0 : No detect1 : detect	0	K4684 %KX7492	K5084 %KX8132	Bit	
Upper/lower limits	0: no use, 1: use	1	K4872 %KX7794	K5272 %KX8434	Bit	

(1) Positioning

- Determine whether to use positioning.
- If not using positioning function, set it '0: no use' while for use, it should be set to '1: use'.
- If setting it as '1:use', though it doesn't execute the instruction related with positioning, it is controlled by positioning.

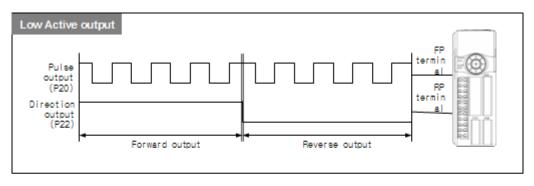
So in this case, though the user turns on this contact point by other application instruction, only output image data of XG5000 monitoring window is on and real output contact point doesn't turn

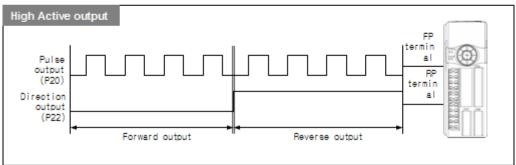
Remark

• Make sure to set it '1: use' to use positioning. If using the instruction related with positioning when it is set as '0: no use", error code 105 occurs.

(2) Pulse output level

- For pulse output level, select either of 'Low Active output' or 'High Active output'.
- •For Low Active output, set as 0, for High Active output, set as 1.
- •The following figure shows output pulse type in case of Low Active and High Active output based on X axis. (in case of Y axis, pulse string output: P21, direction output: P23)





(3) Pulse output mode (For only high end type)

- •XGB built-in positioning can select output mode as one between PLS/DIR mode and CW/CCW
- •If you use CW/CCW mode, select 0. If you use PLS/DIR mode, select 1.
- •About output pulse shape according to each pulse output mode, refer to ch.2.2.3.

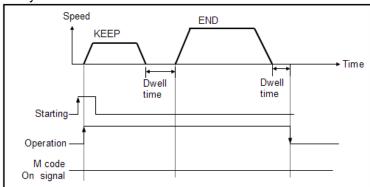
(4) M code output mode (For only high end type)

•In case of using M code function, you can set output timing of M code.

- •M code output mode set in the parameter is applied to all operation step of each axis.
- •The user can select one M code output mode among three modes, NONE, WITH, AFTER. According to each setting value, timing of M code output signal is as follows.

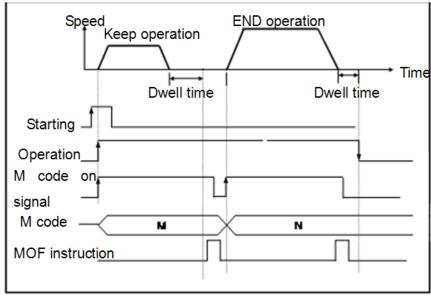
(a) NONE mode

- •In case M code output mode is selected as NONE, though M code is set in operation data, M code doesn't occur like the following figure.
- •If the user use this function, it can prohibit the M code function set per operation step, simultaneously.



(b) WITH mode

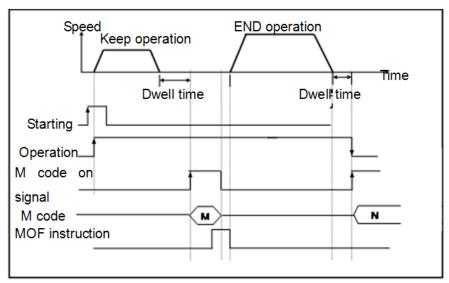
• In case M code output mode is set as WITH, like the following figure, it outpus M code on signal and M code number when each step runs.



< M code output timing in case of WITH mode >

(c) AFTER mode

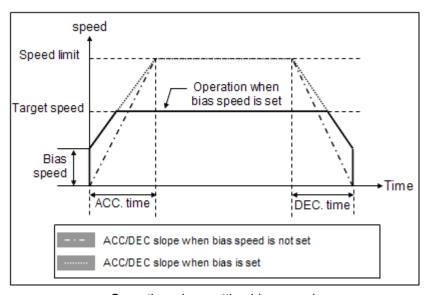
• In case M code output mode is set as AFTER, like the following figure, if each operation of step is completed, it outputs M code On signal and M code number.



< M code output timing in case of AFTER mode >

(5) Bias speed

- · Considering that torque of stepping motor is unstable when its speed is almost equal to 0, the initial speed is set during early operation in order to facilitate motor's rotation and is used to save positioning time. The speed set in the case is called 'bias speed'.
- In case of XGB built-in positioning, setting range of bias speed is 0 ~ 100,000 (unit:pps).
- · Bias speed may be used for
 - (1) Positioning operation by start instruction (IST,DST,SSTetc.)
 - (2) Home operation, JOG operation
 - (3) Main axis of interpolation operation(not available for sub axis)



< Operation when setting bias speed >

- The figure above shows operation when setting bias speed. The entire operation time may be advantageously reduced if bias speed is highly set, but excessive value may cause impact sound at the start/end time and unreasonable operation on a machine.
- Bias speed should be set within the following range.
 - (a) Bias speed ≤ Positioning speed
 - (b) Bias speed ≤ Home Return low speed ≤ Home Return high speed

- (c) Bias speed ≤ JOG high speed
 - → (If home return speed is set lower than bias speed, it generates Error 133; if operation speed is set lower than bias speed during positioning, it generates Error 153; if JOG high speed is set lower than bias speed, it generates Error 121.)

(6) Speed limit

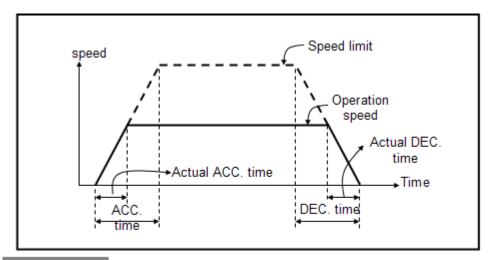
- It refers to the allowable max speed of positioning operation.
- In Pulse unit, the range is between 1 $\,\sim\,$ 1,000,000(unit: pps).
- During position operation, operation speed, home return speed and jog operation speed are affected by speed limit, and if they are set higher than speed limit, it detects error.
 - (1) If home return speed is higher than speed limit: Error 133
 - (2) If positioning speed is higher than speed limit: Error 152
 - (3) If jog operation speed is higher than speed limit: Error 121

(7) ACC/DEC time

- It is applied to sequential operation instruction, speed override, positioning speed override during positioning operation as well as start/end time of positioning operation. At this time, ACC and DEC time is defined as shown below.
 - (a) ACC time: a duration required to reach from "0(stop)" speed to the speed limit set in parameter.

 Using bias would be a time consumed to reach from bias speed set to the speed limit set in parameter.
 - (b) DEC time: a duration required to reach from the speed limit set in parameter up to "0"(stop) speed.

Using bias would be a time consumed to reach from bias speed set to the speed limit set in parameter.



ACC. time: Time to take from stop status to speed limit

Actual ACC. time: Time to take from stop status to operation speed

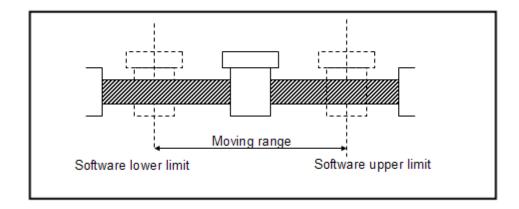
- The range is between 0 \sim 10,000 (unit: 1 ms) per axis.
- ACC/DEC time is set with 4 types and it can be set differently according to each operation data.

(8) S/W Upper/Lower Limit

• A range of a machine's move is called 'stroke limit', and it sets the upper/lower limits of stroke into software upper limit and software lower limit and does not execute positioning if it operates out of ranges set in the above.

Therefore, it is used to prevent against out-of-range of upper/lower limits resulting from incorrect positioning address or malfunction by program error and it needs installing emergency stop limit switch close to a machine's stroke limit.

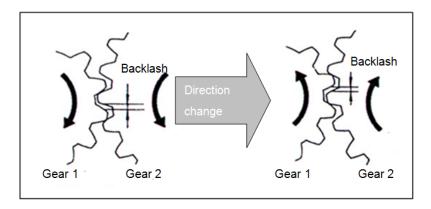
•Except S/W upper limit and lower limit, install limit switch for emergency stop near stroke limit of machine.



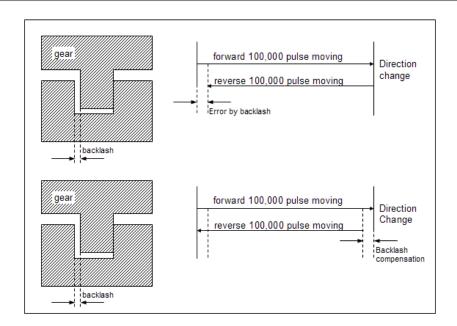
- Range of S/W upper limit and lower limit is checked when starting positioning and operating.
- If an error is detected by setting software upper/lower limits(software upper limit error: 501, software lower limit error: 502), pulse output of positioning module is prohibited. Therefore, to resume operation after an error is detected, it is prerequisite to cancel 'No output'. (No output status is displayed at K4205(%KX6725), for X axis and K4305(%KX6885) for Y axis.
- It can be set according to each axis and range is as follows.
 - S/W upper limit address value range: -2,147,483,648 ~ 2,147,483,647 (unit: Pulse)
 - S/W lower limit address value range: -2,147,483,648 ~ 2,147,483,647 (unit: Pulse)

(9) Backlash Compensation Amount

- · A tolerance that a machine does not operate due to wear when its rotation direction is changed if it is moving with motor axis combined with gear and screw is called 'backlash'.
- Therefore, when changing a rotation direction, it should output by adding backlash compensation amount to positioning amount.
- The range is between 0 \sim 65,535(unit: Pulse) per axis.
- It is available for positioning operation, inching operation and jog operation

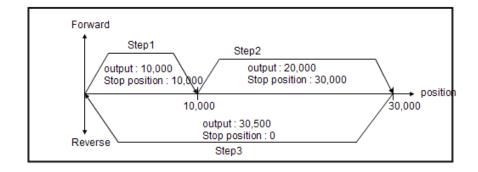


· Backlash compensation outputs backlash compensation amount first and then, address of positioning operation, inching operation and jog operation move to the target positions. (At this time, output as many as backlash amount is not added to the current position address.)



- The above figure describes difference of backlash setting or no backlash setting. In case of not setting backlash compensation amount, it moves as many as 100,000 pulse forward and changes the direction and moves backward as many as 100,000 pulse. It may cause error by backlash. For example, it assumes that backlash is 500 pulse, in case of not setting backlash, final stop location is 500. To compensate this, setting backlash compensation as 500, when changing the direction, 100,500 pulse is yielded adding 500 pulse set as backlash compensation amount. So target stops at the precise stop position.
- The following table indicates real pulse output and stop position in case of setting backlash.
 (Absolute coordinates is used.)

Operation step	Backlash setting amount	Target address	Direction conversion	Real output pulse	Stop positio
1		10,000	Х	10,000	10,000
2	500	30,000	Х	20,000	30,000
3		0	0	-30,500	0



Remark

- Once backlash compensation amount is set or changed, home return should be executed otherwise there can be error at the current position by backlash compensation amount.
- (10) S/W upper/lower limits during constant speed operation
 - It is used to stop pulse output by S/W upper/lower limit detection during constant speed operation by speed control.

• In the case, S/W upper/lower limit detection is available as long as origin is set and the position mark during constant speed operation is "Mark"

(11) Use of Upper/Lower Limits

- To use upper/lower limits during operation, it should be set as "Use".
- Upper/Lower limit input contact point is fixed as the table below and it can be used as normally closed contact point (B contact point).

· If 'No use' is set, it does not detect upper/lower limits and is available with general input contact.

Signal	Input cor	ntact point n	umber	Operation content	Deference
name		Standard	High end	Operation content	Reference
External low limit	-Xierriai X axis P0000 P0008		Detects the X axis external lower limit at the rising edge of input contact point	Acts as	
signal (LimitL)	Y axis	P0002	P000A	Detects the Y axis external lower limit at the rising edge of input contact point.	normally closed
External upper limit	V axis D0003 D0009		P0009	Detects the X axis external upper limit at the rising edge of input contact point.	contact point (B contact point)
signal (LimitH)			P0008	Detects the Y axis external upper limit at the rising edge of input contact point.	

3.2.4 Origin/Manual Parameter Setting for Positioning

Here describes setting range, method of origin/manual parameter for positioning, and special K area for positioning corresponding to each item. They are summarized as the table below.

		Initial		cated	
Item	Setting range	value	X axis XBM/XBC XEC	Y axis XBM/XBC XEC	Data size
Home Return method	0 : origin detection after DOG off 1 : origin detection after deceleration when DOG is On 2 : origin detection by DOG	0	K4780-81 %KX7648-49	K5180-81 %KX8288-89	2 Bit
Home Return direction	0 : forward, 1 : backward	1	K4782 %KX7650	K5182 %KX8290	Bit
Origin address	-2,147,483,648~2,147,483,647[pulse]	0	K469 %KD234	K509 %KD254	Double word
Home Return high speed	1 ~ 100,000[pulse/s]	5,000	K471 %KD235	K511 %KD255	Double word
Home Return low speed	1 ~ 100,000[pulse/s]	500	K473 %KD236	K513 %KD256	Double word
Home Return ACC time	0 ~ 10,000[unit: ms]	1,000	K475 %KW475	K515 %KW515	Word
Home Return DEC time	0 ~ 10,000[unit: ms]	1,000	K476 %KW476	K516 %KW516	Word
Dwell time	0 ~ 50,000[unit: ms]	0	K477 %KW477	K517 %KW517	Word
Jog high speed	1 ~ 100,000[pulse/s]	5,000	K479 %KD239	K519 %KD259	Double word
Jog low speed	1 ~ 100,000[pulse/s]	1,000	K481 %KD240	K521 %KD260	Double word
Jog ACC time	0 ~ 10,000[unit: ms]	1,000	K483 %KW483	K523 %KW523	Word
Jog DEC time	0 ~ 10,000[unit :ms]	1,000	K484 %KW484	K524 %KW524	Word
Inching speed	1 ~ 65,535[pulse/s]	100	K485 %KW485	K525 %KW525	Word

Chapter 3 Before Positioning

(1) Home Return method

- There are three home return methods as follows.
 - a) DOG/Origin(Off):
 - -If origin signal is inputted, it detects the origin signal after DOG changes On -> Off.
 - b) DOG/Origin(On): When DOG is on, it detects the origin after deceleration
 - -If DOG signal is on and origin signal is inputted after deceleration, it detects the origin.
 - c) DOG:
 - -It detects the origin by using DOG signal.
- For more detail of home return method, refer to 3.1.9.

(2) Home Return direction

 Home Return direction is divided into CW(forward) and CCW(backward) depending on pulse output direction.

Setting value	Home Return direction	Pulse output operation of XGB positioning module
0	Forward	Executing forward home return.
1	Backward	Executing backward home return.

(3) Origin address

- It is used to change the current address to a value set in home return address when home return is completed by home return instruction.
- setting range: -2,147,483,648 ~ 2,147,483,647 (unit: Pulse)

(4) Home Return high speed

- As a speed when it returns home by home return instruction, it is divided into high speed and low speed.
- It refers to a speed operating in regular speed section via accelerating section by home return instruction.
- The range of home return high speed is between 1 ~ 100,000(unit: pps)

(5) Home Return low speed

- It refers to a speed operating in regular speed section via decelerating section from home return high speed by home return instruction.
- The range of home return low speed is between 1 \sim 100,000(unit: pps)

Remark

- When setting home return speed, it should be "speed limit ≥ home return high speed ≥ home return low speed".
- It is recommended to set home return low speed as low as possible when setting home return speed. Origin signal detection may be inaccurate if low speed is set too fast.

(6) Home Return ACC/DEC time

- When it returns home by home return instruction, it returns home at the speed of home return high speed and home return low speed by ACC/DEC time.
- The range of home return ACC/DEC time is between $0 \sim 10,000$ (unit: 1 ms).

(7) Dwell time

- It sets Dwell time applied to Home Return
- Dwell time is necessary to maintain precise stop of servo motor when positioning by using a servo motor.
- The actual duration necessary to remove remaining pulse of bias counter after positioning ends is called 'dwell time'.

• The range of home return dwell time is between 0 \sim 50,000 (unit: 1 ms)

(8) JOG high speed

- · Jog speed is about jog operation, one of manual operations and is divided into jog low speed operation and jog high speed operation.
- · Jog high speed operation is operated by patterns with accelerating, regular speed and decelerating sections. Therefore, job is controlled by ACC/DEC instruction in accelerating section and decelerating section.
- The range of jog high speed is between 1 \sim 100,000(unit: 1pps)

(9) JOG low speed

- · Jog low speed operation is operated with patterns of accelerating, regular speed and decelerating sections.
- The range of jog low speed is between 1 \sim 100,000 (unit: 1pps)

Remark

- When setting JOG high speed, it should be "Speed limit ≥ JOG high speed ≥ Bias speed".
- When setting JOG low speed, it should be smaller than JOG high speed.

(10) JOG ACC/DEC time

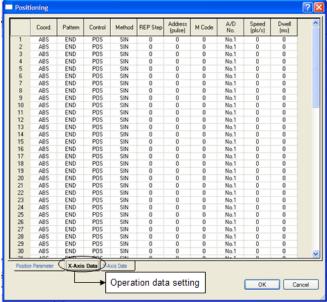
- It refers to JOG ACC/DEC time during jog high/low speed operation.
- The range of JOG ACC/DEC time is between 0 \sim 10,000 (unit: 1 ms)

(11) Inching speed

- The inching operation speed is set.
- The range of inching speed is between 1 \sim 65,535 (unit: 1pps)
- For detail of inching operation, refer to 3.1.12.

3.3 Positioning Operation Data

It describes operation data for XGB positioning. If the user select 'X axis data' or 'Y axis data' tap in the positioning parameter setting window, the following figure is displayed. Each axis can have 30~80 (standard type: 30 steps, compact stand/high-end type: 80steps) steps of operation data.



Each of item can have a following data

Step	Item	Range	Initial	Device	e area	Remarks
Otop	itom	Runge	values	X-axis	Y-axis	Remarks
	Coord.	0 : ABS, 1 : Incremental	ABS	K5384	K8384	Bit
	5 "	0 : end, 1 : continuous, 2 :		%KX8612 K5382~3	%KX13412 K8382~3	
	Pattern	sequential	End	%KX8610-11	%KX13410-11	Bit
	Control	0 : position control, 1 : speed	Position	K5381	K8381	Bit
		control		%KX8609 K5380	%KX13409 K8380	- Dit
	Method	0: single, 1 : repeat	Single	%KX8608	%KX13408	Bit
	REP	0~30(High end 0~80)	0	K539	K839	\
1	1 (2)	,		%KW539	%KW839	Word
	Address(pulse)	-2,147,483,648 ~ 2,147,483,647	0	K530	K830	Double
		[pulse]		%KD265 K537	%KD415 K837	word
	M Code	0 ~ 65,535	0	%KW539	%KW837	Word
	A/D No.	0 : No.1, 1 : No.1, 2 : No.3 3 : No.4	0	K5386-87	K8386-87	Bit
	775110.	0 : 110:1, 1 : 110:1, 2 : 110:0 0 : 110:1	Ů	%KX8614-15	%KX13414-15	
	Speed	1 ~ 100,000[pulse/sec]	0	K534	K834	Double
				%KD267	%KD417	word
	Dwell time	0 ~ 50,000[unit: ms]	0	K536 %KW536	K836 %KW836	Word
2		Come items with No. 4 stem	l .	K540~549	K840~849	
2		Same item with No.1 step		%KW540~549	%KW840~849	
3~30		Same item with No.1 step		K550~829	K850~1129	
3*30		Same item with No. 1 step		%KW550~829	%KW850~1129	
31		Same item with No.1 step		K2340~2349 %KW2340~2349	K2840~2849 %KW2840~2849	Only for
		·		K2350~2839	K2850~3339	high end
32~80		Same item with No.1 step		%KW2350~2839	%KW2850~3339	type

(1) Step number

- The range of positioning data serial number is between 1 ~ 30. (compact standard/high-end type is 1~80)
- When executing indirect start, simultaneous start, linear interpolation operation, position synchronization and etc., if you designates the step number of data to operate, it operates according to positioning dedicated K area where operation data is saved.
- If step number is set as 0, operation step indicated at the current step number (X axis: K426(%KW426), Y axis: K436(%KW436)) of positioning monitor flag is operated.

Remark

 The user can use variable of dedicated K area per each step easily by using Register U Device. For detail of monitor registration of positioning, refer to XG5000 user manual.

(2) Coordinates

- Here sets the coordinates method of relevant operation step data.
- Coordinates methods selectable are absolute coordinate and Incremental coordinate.
- For more detail, refer to 3.1.2.

(3) Operation pattern (END/KEEP/CONT) and operation method (SIN/REP)

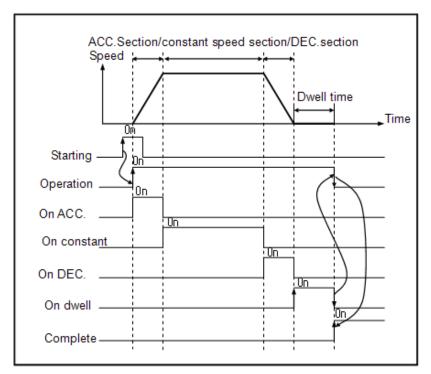
- The user can select one pattern among three operation patterns per step. It can configure how to use the positioning operation data.
- Operation pattern can be set as follows according to Control and Method on the operation data.

Control	Method	Pattern	Reference
		END	
	SIN	KEEP	
POS		CONT	Linear interpolation is not available
F03		END	
	REP	KEEP	
		CONT	Linear interpolation is not available
		END	Linear interpolation is not available
SPD	SIN	KEEP	Linear interpolation is not available
		CONT	Not available
		END	Linear interpolation is not available
속도 제어	REP	KEEP	Linear interpolation is not available
		CONT	Not available

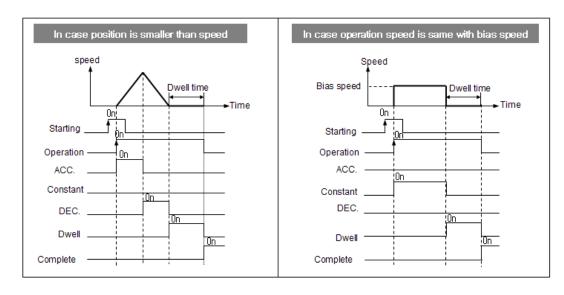
• In case Method is set as SIN, the next operation step become 'current operation step + 1'. And in case Method is set as REP, the next operation step become the step set in REP Step.

(a) END (SIN)

• It refers to execute the positioning to target address by using the data of operation step and complete the positioning after dwell time.



Generally with END operation, position operation is executed according to pre-arranged speed and
position like above picture as ladder shape with accelerated, constant, and decelerated intervals.
However depending on position and speed settings, special shapes besides a ladder can be
witnessed as below.

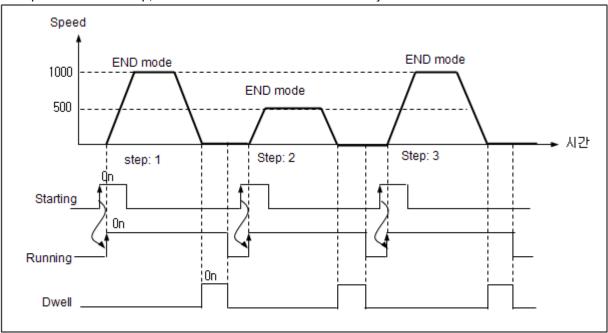


- 1) In case target address is far less than speed, it can't pass the acceleration regular speed deceleration section. In this case, the positioning is complete without regular speed section.
- 2) In case operation speed is same with bias speed, target moves with regular speed (bias speed) and it stops without deceleration section.

• It assumes that operation data is as follows to describe END/SIN operation.

Step no.	Coord	Pattern	Contr ol	Metho d	REP Step	Address [Pulse]			Speed [pls/s]	Dwell [ms]
1	ABS	END	POS	SIN	0	10,000	0	1	1,000	100
2	ABS	END	POS	SIN	0	20,000	0	1	500	100
3	ABS	END	POS	SIN	0	30,000	0	1	1,000	100

- In the above table, operation pattern is set as END, target moves once by once start command and since Method is set as SIN, the next step becomes 'current operation step + 1'.
- To operate the next step, one more start command is necessary.

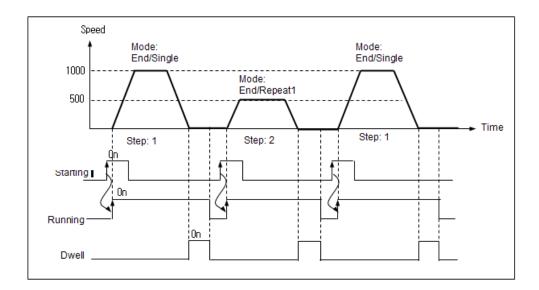


(b) END operation (Repetition)

- · In case END operation (repetition), operation of currently started operation is same with END operation (single).
 - But, The next step becomes the step set in the REP Step, which is different with END operation (single).
- It assumes that operation data is set as follows to describe END/Repetition.

Step No.	Coord	Pattern	Contr ol	Metho d	REP Step	Address [Pulse]	M code	A/D No.	Speed [pls/s]	Dwell [ms]
1	ABS	END	POS	SIN	0	10,000	0	1	1,000	100
2	ABS	END	POS	REP	1	20,000	0	1	500	100
3	ABS	END	POS	SIN	0	30,000	0	1	1,000	100

- 1) By first start command, target moves to 10,000 pulse with 1,000pps speed and stops. At this time, since Method is SIN, the next operation step becomes the no.2 step, current operation step +1.
- 2) By second start command, target moves to 20,000 with 500pps and stops. At this time, Method is REP, the next operation step becomes no.1 step set in REP Step, not no.3 step.
- 3) If third start command is inputted, target moves to 10,000 ABS coordinates with 1,000 pps.
- 4) Like this, no.1 step and no.2 step are repeated whenever start command is executed so no.3 step is not operated.



Remark

- •If the operation mode is set as single, set the operating step number in the IST at 0, then the step specified in the current step number (axis X: K426(%KW426), axis Y: K436 (%KW436)) in area K for positioning.
- •If the operation mode is set as Repeat and the Repeat step is set at 0, the step stops operating and the next step changes into 0.
 - In this case, the operating step gets out of the range of 1~30 (1~80 for the compact standard/high-end type) and error code 512 comes out, so be careful of the repeating step setting when you set at the repeating operation.

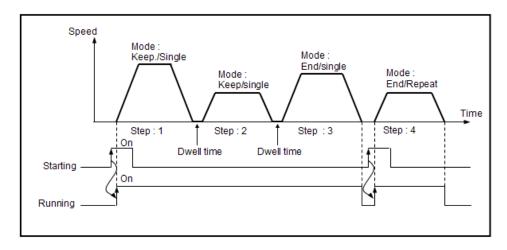
(c) Continued Operation

- •Continued operation refers to the operation which carried out positioning to the target position by using the data of the corresponding operating step by the operation instruction and continues the next operating steps without any additional operation instructions with the positioning not completed after the dwell time.
- •The next operating steps differ according to the current operating mode of the steps.
 - A) The operation mode of the current step is single: current operating step + 1
 - B) The operation mode of the current step is repetition: the step designated as Repeat in the current operation step
- •If you use the continued operation pattern, you can conduct the pattern operation that sequentially carried out multiple operating steps with only one operation instruction.
- •The continued operation can be explained with the operation data in the following table.

Step No.	Coordina tes	Operation pattern	Control	Operation mode	Repeatin g step	Target position [Pulse]	M code	Acc./Dec. No.	Speed [pls/s]	Dwell time [ms]
1	Absolute	Keep	Position	Single	0	10,000	0	0	1,000	100
2	Absolute	Keep	Position	Single	0	20,000	0	0	500	100
3	Absolute	End	Position	Single	0	30,000	0	1	1,000	0
4	Absolute	End	Position	Repeat	1	40,000	0	1	500	0

- 1) Steps 1 and 2 are continued in the operation pattern and single in the operation mode, so they operate at 1,000pps to the pulse of absolute coordinates 10,000 and then operates step 2, the next step, without waiting for the next operation instruction when the dwell time passes. If the dwell time passes after step 2, step 3 is operated.
- 2) Step 3, of which the operation pattern is end, operates up to absolute coordinates 30,000, and then stops right away because the dwell time is 0, and the positioning completion bit turns on for a scan.

- 3) Since the operation mode of step 3 is single, the next step is No. 4.
- 4) Step 4 has been set as end/repeat 1, it operates up to absolute coordinates 40,000 when step 4 operates by the second operation instruction, and stops without dwell time, and the next step points at step 1 which has been designated as the Repeat step.
- 5) The operation pattern can be illustrated as follows.

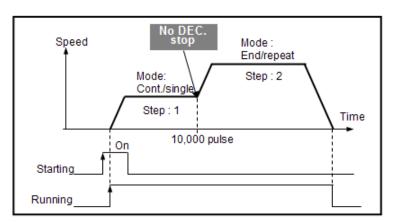


(d) Incessant Operation

- Incessant operation refers to the operation that continues the steps set as continued operation by the operation instruction.
- The continued operation can be explained with the operation data in the following table.

Step No.	Coordina tes	Operation pattern	Control	Operation mode	Repeatin g step	Target position [Pulse]	M code	Acc./Dec. No.	Speed [pls/s]	Dwell time [ms]
1	INC	Continuous	Position	Single	0	10,000	0	1	500	100
2	INC	End	Position	Repeat	1	20,000	0	1	1,000	0

- 1) Since the operation pattern of step 1 has been set as continued, it operates up to the incremental coordinates 10,000 pulse at 500pps by the first operation instruction, and changes the operation speed to 1,000pps without deceleration or stop and continues to operate step 2.
- 2) Because the operation pattern of step 2 is end, it moves to incremental coordinates 20,000 and the positioning ends after the dwell time.



Remark

• If the direction changes during the continued operation, error code 511 comes out and the operation stops. If the direction has to change, change "Continuous" into "End" or "Keep".

(4) Repeat Step

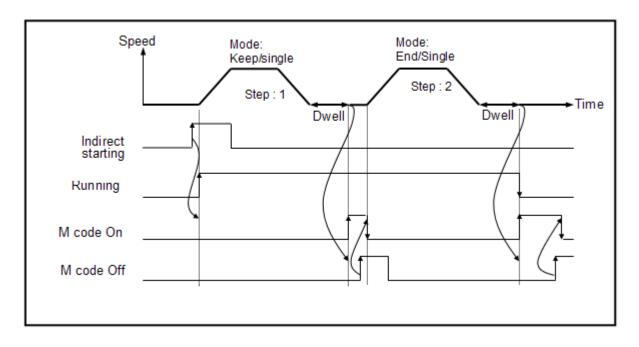
- Sets the step to repeat when the operation mode is set as Repeat.
- The setting range is 1~30 (1~80 for the compact standard/high-end type).

(5) Target Position

- Sets the movement of the operation of the step.
- The setting range is -2,147,483,648 ~ 2,147,483,647 (unit: Pulse).
 - The target position set in operation data setting can be freely changed in the program by changing the value of area K for positioning.
- For the address of area K for positioning of each step number, see 2.2.

(6) M Code

- M code is for checking the current operation step or carrying out the auxiliary work such as tool change, clamp, and drill rotation.
- In general, the output of M code divides into the 'With' mode, when M code is output with the step operating, and the 'After' mode when M code is output after the step operation is completed. For XGB built-in positioning, the standard type has only the After mode, and the advanced type has all modes.
- For example, if M code output mode is set as the After mode, the positioning of the step is completed and at the same time, the M code On signal (axis X: K4203(%KX6723), axis Y: K4303 (%KX6883)) is set and the M code number set in the M code item of the step operation data is output in the M code output device (axis X: K428(%KW428), axis Y: K438(%KW438)).
- M code can be set differently for the operation steps of the positioning operation data. The setting range is 1 ~ 65,535. If you don't want to use M code function for the step, just set it at 0. If you don't want to use M code function for any step, set the M code output mode parameter as NONE.
- If there is the M code signal, you can reset it by using the M code Off instruction (MOF).
- If there is the M code signal, the operation differs depending on the current operation pattern.
 - (a) End: Stops with M code coming out. For operation of the next operation step, the M code should be reset and the operation instruction should be executed.
 - (b) Continued: Enters the Stand-by status for operation of the next step with M code coming out. For operation of the next operation step, if the M code is reset, the next operation step is operated without additional operation instructions.
 - (c) Incessant: Does not stop and operates the next operation step although M code comes out. In this case, M code Off instruction can be carried out even during operation.
- For example, the output timing of M code signals in case of After Mode can be illustrated as follows.



Remark

· With M code signal On, if you execute the next operation step number, error code 233 will come out and the operation will not happen.

Therefore, for positioning of the next operation step number with M code signal "On," you must reset M code signal as M code Off instruction (MOF).

(7) Acceleration/Deceleration Numbers

- Sets the Acc./Dec. numbers to be used in the step during the acceleration/deceleration time set in the basic positioning parameter.
- The setting range is 1~4.
- For details about the acceleration/deceleration time, see 3.2.3.

(8) Operation Speed

- Set the target speed at which to operate in the step.
- The setting range is $1 \sim 100,000$ pulse (unit:1pps).
- The operation speed should be set higher than or equal to the bias speed set in the basic positioning parameter, and lower than or equal to the speed limit.

(9) Dwell Time

- The dwell time to be applied to the operation step.
- The dwell time refers to the time needed to maintain the precise stop of the servo motor in controlling the positioning by using the servo motor, and also the standby time given before the next positioning operation when one positioning operation is finished.
- · Especially when the servo motor is used, it might not reach the target position or stay excessive even though the output of the positioning function has been stopped, so the dwell time is the data that set the standby time until the stable rest.
- The operation status of the axis of the XGB positioning function during the dwell time maintains "Operation," and if the dwell time passes, the operation status signaling bit (axis X: K4200(%KX6720), axis Y: K4300(%KX6880)) turns Off and the positioning completion signal turns On.

3.4 Positioning Status Monitoring and Area K for Input and Output

The XGB built-in positioning function controls positioning by using area K for positioning and the parameters. This Chapter describes area K for positioning.

For the relations between the XGB built-in positioning parameters and area K, see 3.2.2.

XGB built-in positioning area K divides into the bit flag, word, and double word flag. The flag in turn divides into the status monitoring flag area (for read only) and the flag for instruction and command (for read and write).

3.4.1 Status Monitoring and Flag for Positioning

This chapter describes the XGB built-in status monitoring flag for positioning (for read only). The status monitoring flag divides into bit, word, and double word.

(1) Bit Area Flag

(a) XBM/XBC bit area flag

			Device	e Area			
Variables		Axis)	(Axis	Υ	Status
	Word	Bit	Address	Word	Bit	Address	
In operation		0	K4200		0	K4300	0: stop, 1: operation
Error		1	K4201		1	K4301	0: no error, 1: error
Positioning completed		2	K4202		2	K4302	0: not completed, 1: completed
M code signal		3	K4203		3	K4303	0:M code Off, 1:M code On
Origin settled		4	K4204		4	K4304	0: origin not decided, 1: origin decided
No pulse output		5	K4205		5	K4305	0: output available, 1: no output
Stopped		6	K4206		6	K4306	0: not stopped 1: stopped
Upper limit detected		8	K4208		8	K4308	0: undetected, 1: detected
Lower limit detected	K420	9	K4209	K430	9	K4309	0: undetected, 1: detected
Emergency stop	K420	Α	K420A	11450	А	K430A	0: normal, 1: abnormally stopped
Normal/backward rotation		В	K420B		В	K430B	0: normal direction, 1: backward direction
Operation (acceleration)		С	K420C		С	K430C	0: not accelerated, 1: accelerated
Operation (constant speed)		D	K420D		D	K430D	0: not constant speed, 1: constant speed
Operation (deceleration)		E	K420E		Е	K430E	0: not decelerated, 1: decelerated
Operation (dwell)		F	K420F		F	K430F	0: not during dwell, 1: during dwell
Operation (positioning)		0	K4210		0	K4310	position not controlled position controlled
Operation (speed control)		1	K4211		1	K4311	0: speed not controlled 1: speed controlled
Operation control (straight interpolation)	K421	2	K4212	K431	2	K4312	0: interpolation not controlled 1: interpolation controlled
Return to origin		5	K4215		5	K4315	0: not returning to origin 1: returning to origin
Position synchronization		6	K4216		6	K4316	0: position not synchronized 1: position synchronized

Speed synchronization	7	K4217	7	K4317	0: speed not synchronized 1: speed synchronized
Jog low speed	8	K4218	8	K4318	0: jog not at low speed 1: jog at low speed
Jog high speed	9	K4219	9	K4319	0: jog not at high speed 1: jog at high speed
Inching operation	А	K421A	А	K431A	0:not during inching operation 1: during inching operation

(a) XEC bit area flag

	Devid	ce area	
Variables	Axis X	Axis Y	Status
	Address	Address	
In operation	%KX6720	%KX6880	0: stop, 1: operation
Error	%KX6721	%KX6881	0: no error, 1: error
Positioning completed	%KX6722	%KX6882	0: not completed, 1: completed
M code signal	%KX6723	%KX6883	0:M code Off, 1:M code On
Origin settled	%KX6724	%KX6884	0: origin not decided, 1: origin decided
No pulse output	%KX6725	%KX6885	0: output available, 1: no output
Stopped	%KX6726	%KX6886	0: not stopped 1: stopped
Upper limit detected	%KX6728	%KX6888	0: undetected, 1: detected
Lower limit detected	%KX6729	%KX6889	0: undetected, 1: detected
Emergency stop	%KX6730	%KX6890	0: normal, 1: abnormally stopped
Normal/backward rotation	%KX6731	%KX6891	0: normal direction, 1: backward direction
Operation (acceleration)	%KX6732	%KX6892	0: not accelerated, 1: accelerated
Operation (constant speed)	%KX6733	%KX6893	0: not constant speed, 1: constant speed
Operation (deceleration)	%KX6734	%KX6894	0: not decelerated, 1: decelerated
Operation (dwell)	%KX6735	%KX6895	0: not during dwell, 1: during dwell
Operation (positioning)	%KX6736	%KX6896	position not controlled position controlled
Operation (speed control)	%KX6737	%KX6897	0: speed not controlled 1: speed controlled
Operation control (straight interpolation)	%KX6738	%KX6898	interpolation not controlled interpolation controlled
Return to origin	%KX6741	%KX6901	0: not returning to origin 1: returning to origin
Position synchronization	%KX6742	%KX6902	0: position not synchronized 1: position synchronized
Speed synchronization	%KX6743	%KX6903	0: speed not synchronized 1: speed synchronized
Jog low speed	%KX6744	%KX6904	0: jog not at low speed 1: jog at low speed
Jog high speed	%KX6745	%KX6905	0: jog not at high speed 1: jog at high speed
Inching operation	%KX6746	%KX6906	0:not during inching operation 1: during inching operation

(2) Status Monitoring Data Area

(a) XBM/XBC status monitoring area

Variables	Axi	is X	Ax	is X	Status
	Address	Properties	Address	Properties	
Current position	K422	Double word	K432	Double word	Shows current position
Current speed	K424	Double word	K434	Double word	Shows current speed
Step No.	K426	Double word	K436	Word	Shows current operation step
Error code	K427	Word	K437	Word	Shows error code in case of an error
M code No.	K428	Word	K438	Word	Shows M code number when M code is on

(b) XBM/XBC status monitoring area

		Device	e Area		
Variables	Ax	is X	Axi	s Y	Status
	Address	Properties	Address	Properties	
Current position	%KD211	Double word	%KD216	Double word	Shows current position
Current speed	%KD212	Double word	%KD217	Double word	Shows current speed
Step No.	%KW426	Double word	%KW436	Word	Shows current operation step
Error code	%KW427	Word	%KW437	Word	Shows error code in case of an error
M code No.	%KW428	Word	%KW438	Word	Shows M code number when M code is on

3.4.2 Flag for Positioning Instruction and Command

The flag for positioning instruction and command divides as follows. You can easily conduct positioning operation without positioning instruction using the flag. If you change the flag for instruction of area K, the scan ends and applies in the next scan.

(1) Bit Area Flag

(a) XBM/XBC bit area flag

			Device				
Variables		Axis	X		Axis `	Y	Status
	Word	Bit	Address	Word	Bit	Address	
Start signal		0	K4290		0	K4390	Indirect start at rising edge
Normal direction jog		1	K4291		1	K4391	0: stop jog, 1: normal direction jog operation
Backward direction jog	K429	2	K4292	K439	2	K4392	0: stop jog,, 1: normal direction jog operation
Jog high/low speed		3	K4293		3	K4393	0: jog low speed, 1: jog high speed
M dttd-	1// 1/00	1	K4681	1/500	1	K5081	O. NONE 4. WITH O. AFTER
M code output mode	K468	2	K4682	K508	2	K5082	0: NONE, 1: WITH, 2: AFTER

Upper/lower limit detection of S/W allowed during constant speed operation		4	K4684		4	K5084	0: detection not allowed, 1: detection allowed
Return-to-origin method	K478	0,1	K4780~1	K518	1	K5180~1	0: approximate origin/origin(OFF) 1: approximate origin/origin (On) 2: approximate origin
Return-to-origin direction		2	K4782		2	K5182	0: normal direction, 1: backward direction
Use for positioning		0	K4870		0	K5270	0: no use, 1: use
Pulse output level	K487	1	K4871		1	K5271	0: low Active,1: high Active
Use of upper/lower limit		2	K4872	K527	2	K5272	0: no use, 1: use
Pulse output mode		3	K4873		3	K5273	0: CW/CCW, 1: PLS/DIR

(b) XEC bit area flag

	Devic	ce area	
Variables	Axis X	Axis Y	Status
	Address	Addreess	
Start signal	%KX6864	%KX7024	Indirect start at rising edge
Normal direction jog	%KX6865	%KX7025	0: stop jog, 1: normal direction jog operation
Backward direction jog	%KX6866	%KX7026	0: stop jog,, 1: normal direction jog operation
Jog high/low speed	%KX6867	%KX7027	0: jog low speed, 1: jog high speed
M d d-	%KX7489	%KX8129	O NONE 4: WITH O AFTER
M code output mode	%KX7490	%KX8130	0: NONE, 1: WITH, 2: AFTER
Upper/lower limit detection of S/W allowed during constant speed operation	%KX7492	%KX8132	0: detection not allowed, 1: detection allowed
Return-to-origin method	%KX7648-49	%KX8288-89	0: approximate origin/origin(OFF) 1: approximate origin/origin (On) 2: approximate origin
Return-to-origin direction	%KX7650	%KX8290	0: normal direction, 1: backward direction
Use for positioning	%KX7792	%KX8432	0: no use, 1: use
Pulse output level	%KX7793	%KX8433	0: low Active,1: high Active
Use of upper/lower limit	%KX7794	%KX8434	0: no use, 1: use
Pulse output mode	%KX7795	%KX8435	0: CW/CCW, 1: PLS/DIR

(c) Starting Signals

- 1) The starting signals conducts positioning operation according to the current operation step number (axis X: K426(%KW426), axis Y: K436(%KW436)) without setting the step number unlike indirect or direct starting.
- 2) Since the current operation step area is for read only, if you want to change the operation step number, you need to use the starting step number change instruction (SNS, APM_SNS).
- 3) The following program is an example of the program that indirectly starts with the operation data displayed in the current step number (K426) on axis X by setting the starting signal whenever

Chapter 3 Before Positioning

the external input starting switch (P000F) turns On.

	P000F	K04200	K04201		K04290
)	Starting switch	XAxis BUSY	XAxis Error		XAxis Start
	P000F				K04290
1	Starting switch				XAxis Start

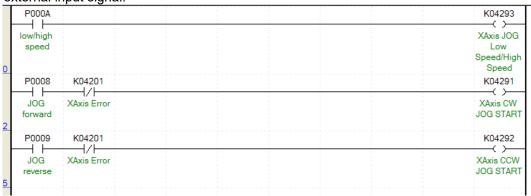
Device	Description	Device	Description
P000F(%IX0.0.15)	Axis X starting external switch	K4201(%KX6721)	Axis X error
K4200(%KX6720)	Axis X signal during operation	K4290(%KX6864)	Axis X starting instruction flag

- The program above is an example of the program that indirectly starts with the operation data of the current step number (K426 word) on axis X by setting the starting signal whenever the external input starting switch (P000F) turns On.
- When the starting switch turns On, the starting commanding flag (K4290) is set and axis X starts, and when the starting switch turns Off, the starting contact point is reset.
- Note that the set coil is used for axis X starting commanding flag (K4290) instead of ordinary coil output.

For example, if a toggle switch is used for the starting switch, and if the starting commanding flag (K4290) is not set but ordinary coil output is used, there might be the problem that it is automatically restarted by the bit Off during operation when positioning is completed. To avoid this, use a push button switch for the external input switch, and use a set coil and reset coil according to the On/Off of the input switch for the starting commanding flag.

(b) Jog Operation

1) The following program is an example of the program that carries out the jog operation of axis X by turning on/off the flag for commanding the normal/backward direction jog according to the external input signal.



Device	Description	Device	Description
P0008(%IX0.0.8)	External input of normal direction jog	K4201(%KX6721)	Flag displaying axis X error
P0009(%IX0.0.9)	External input of backward direction jog	K4291(%KX6865)	Flag commanding normal direction jog of axis X
P000A(%IX0.0.10)	External input of jog low speed/high speed	K4292(%KX6866)	Flag commanding backward direction jog of axis X
K4200(%KX6720)	Signal of axis X during operation	K4293(%KX6867)	Flag commanding jog low/high speed of axis X

- The program above is an example of the program that carries out the jog operation in the corresponding direction while the external input normal direction jog switch (P0008) or backward direction jog switch (P0009) in On.
- Then the operation speed is jog high speed if the jog low/high speed external input (P000A) is On, and high low if Off, and can be changed during jog operation, too.
- · As the start and stop of jog operation is done by the level of the input signals, if the input signal (P0008, P0009) is On, it operates, and if Off, it carries out jog stop.
- If both jog normal direction operation and backward direction operation are On, there is no error code in XGB built-in positioning, but it stops if it is currently in operation.

Remark

• If you do jog operation by adding the signal (K4200(%KX6720), K4300(%KX6880)) during operation as the normally closed contact point (contact point B) for the jog operation input condition, it alternates starting and stopping according to the On/Off of the signal during operation.

(2) Data Area for Positioning Setting (a) In case of XBM/XBC

(a) III case of ABM/ABC		Device			
Variables	Α	xis X		Axis Y	Status
	Address	Properties	Address	Properties	
Bias speed	K0450	Double word	K0490	Double word	Sets bias speed.
Speed limit	K0452	Double word	K0492	Double word	Sets maximum speed limit.
Acceleration time 1	K0454	Word	K0494	Word	Sets acceleration time 1.
Deceleration time 1	K0455	Word	K0495	Word	Sets deceleration time 1.
Acceleration time 2	K0456	Word	K0496	Word	Sets acceleration time 2.
Deceleration time 2	K0457	Word	K0497	Word	Sets deceleration time 2.
Acceleration time 3	K0458	Word	K0498	Word	Sets acceleration time 3.
Deceleration time 3	K0459	Word	K0499	Word	Sets deceleration time 3.
Acceleration time 4	K0460	Word	K0500	Word	Sets acceleration time 4.
Deceleration time 4	K0461	Word	K0501	Word	Sets deceleration time 1
Upper limit of software	K0462	Double word	K0502	Double word	Sets upper limit value of software.
Lower limit of software	K0464	Double word	K0504	Double word	Sets lower limit value of software.
Backlash correction	K0466	Word	K0506	Word	Sets backlash correction value.
Origin address	K0469	Double word	K0509	Double word	Sets origin address for origin return.
High speed of origin return	K0471	Double word	K0511	Double word	Sets high speed for origin return.
Low speed of origin return	K0473	Double word	K0513	Double word	Sets low speed for origin return.
Acceleration time for origin return	K0475	Word	K0515	Word	Sets acceleration time for origin return
Deceleration time for origin return	K0476	Word	K0516	Word	Sets deceleration time for origin return
Dwell time for origin return	K0477	Word	K0517	Word	Sets dwell time for origin return
Jog high speed	K0479	Double word	K0519	Double word	Sets high speed for jog operation.
Jog low speed	K0481	Double word	K0521	Double word	Sets low speed for jog operation
Jog acceleration time	K0483	Word	K0523	Word	Sets acceleration time for jog operation
Jog deceleration time	K0484	Word	K0524	Word	Sets deceleration time for jog operation
Inching speed	K0485	Word	K0525	Word	Sets operation speed for inching operation.

(b) In case of XEC

(b) In case of XEC		Devic			
Variables	A	xis X		xis Y	Status
	Address	Properties	Address	Properties	
Bias speed	%KD225	Double word	%KD245	Double word	Sets bias speed.
Speed limit	%KD226	Double word	%KD246	Double word	Sets maximum speed limit.
Acceleration time 1	%KW454	Word	%KW494	Word	Sets acceleration time 1.
Deceleration time 1	%KW455	Word	%KW495	Word	Sets deceleration time 1.
Acceleration time 2	%KW456	Word	%KW496	Word	Sets acceleration time 2.
Deceleration time 2	%KW457	Word	%KW497	Word	Sets deceleration time 2.
Acceleration time 3	%KW458	Word	%KW498	Word	Sets acceleration time 3.
Deceleration time 3	%KW459	Word	%KW499	Word	Sets deceleration time 3.
Acceleration time 4	%KW460	Word	%KW500	Word	Sets acceleration time 4.
Deceleration time 4	%KW461	Word	%KW501	Word	Sets deceleration time 1
Upper limit of software	%KD231	Double word	%KD251	Double word	Sets upper limit value of software.
Lower limit of software	%KD232	Double word	%KD252	Double word	Sets lower limit value of software.
Backlash correction	%KW466	Word	%KW506	Word	Sets backlash correction value.
Origin address	%KD234	Double word	%KD254	Double word	Sets origin address for origin return.
High speed of origin return	%KD235	Double word	%KD255	Double word	Sets high speed for origin return.
Low speed of origin return	%KD236	Double word	%KD256	Double word	Sets low speed for origin return.
Acceleration time for origin return	%KW475	Word	%KW515	Word	Sets acceleration time for origin return
Deceleration time for origin return	%KW476	Word	%KW516	Word	Sets deceleration time for origin return
Dwell time for origin return	%KW477	Word	%KW517	Word	Sets dwell time for origin return
Jog high speed	%KD239	Double word	%KD259	Double word	Sets high speed for jog operation.
Jog low speed	%KD240	Double word	%KD260	Double word	Sets low speed for jog operation
Jog acceleration time	%KW483	Word	%KW523	Word	Sets acceleration time for jog operation
Jog deceleration time	%KW484	Word	%KW524	Word	Sets deceleration time for jog operation
Inching speed	%KW485	Word	%KW525	Word	Sets operation speed for inching operation.

(3) Status Monitoring and Commanding Flag by Operation Step (a) In case of XBM/XBC (Step 01)

	Device area			
Variables	Axis X	Axis Y	properties	Status
	Address	Address	properties	
Step 01 target position	K0530	K0830	Double word	
Step 01 operation speed	K0534	K0834	Double word	
Step 01 dwell time	K0536	K0836	Word	
Step 01 M code number	K0537	K0837	Word	
Step 01 operation method	K05380	K08380	Bit	
Step 01 control method	K05381	K08381	Bit	
Step 01 operation pattern (Low)	K05382	K08382	Bit	
Step 01 operation pattern (High)	K05383	K08383	Bit	
Step 01 coordinates	K05384	K08384	Bit	
Step 01 acc./dec. number (Low)	K05386	K08386	Bit	
Step 01 acc./dec. number (High)	K05387	K08387	Bit	
Step 01 coordinates	K0539	K0839	Word	

(b) In case of XBM/XBC (Step 01)

(b) in case of ABM/ABC	(Step 01)			
		Device area		
Variables	Axis X	Axis Y	properties	Status
	Address Address		properties	
Step 01 target position	%KD265	%KD415	Double word	
Step 01 operation speed	%KD267	%KD417	Double word	
Step 01 dwell time	%KW536	%KW836	Word	
Step 01 M code number	%KW537	%KW837	Word	
Step 01 operation method	%KX8608	%KX13408	Bit	
Step 01 control method	%KX8609	%KX13409	Bit	
Step 01 operation pattern (Low)	%KX8610	%KX13410	Bit	
Step 01 operation pattern (High)	%KX8611	%KX13411	Bit	
Step 01 coordinates	%KX8612	%KX13412	Bit	
Step 01 acc./dec. number (Low)	%KX8614	%KX13414	Bit	
Step 01 acc./dec. number (High)	%KX8615	%KX13415	Bit	
Step 01 coordinates	%KW539	%KW839	Word	

- The table above shows the area K for positioning of the operation step #1. You can change the operation data without setting the parameters by changing the value of the corresponding area K.
- If you want to permanently preserve the operation data of the changed area K, apply the data of current area K to the built-in parameter area by using the applied instruction (WRT instruction, APM_WRT instruction).

Remark

- Note that area K for positioning is initialized if you cut the power and re-supply power or if you change the operation mode without executing the WRT instruction after changing the value of
- The variable of area K for each step can be used more conveniently by using the variable registration function of XG5000. For the positioning monitor registration, see the manual of XG5000.

Chapter 4 Positioning Check

This Chapter describes how to test the operation test to check whether the positioning function is well performed before the XGB positioning function is used.

4.1 The Sequence of Positioning Check

This is for checking whether the XGB positioning operation is normally performed by carrying out normal and reverse direction jog operation. The sequence is as follows.

(1) Power Off

- Distribution is needed to check the XGB positioning operation. Before distribution, turn off XGB.
- Be sure to check whether the PWR LED of XGB is off before moving on to the next step.

(2) Input Signal Distribution

- Distribute the input signals needed to check the operation as follows.
- Do not connect the output signal line to the motor driver. If there is a problem with the PLC hardware, connecting to the motor driver might lead to malfunction or damage to the equipment.

Input Signal	Contact Point	Co	ontact Poi	nt No.	Remark	
	Туре		XBC	XEC		
Jog normal direction switch		Axis X	P0010	%IX0.0.16	Contact point randomly selected	
	Contact point	Contact point	Axis Y	P0011	%IX0.0.17	Contact point randomly selected
Jog reverse direction switch	normally open (A)	Axis X	P0012	%IX0.0.18	Contact point randomly selected	
		Axis Y	P0013	%IX0.0.19	Contact point randomly selected	

(3) Making the Program for Operation Check

 Make the program for checking the operation by using XG5000. For the details and making of the program, see '4.2 Making of the Program for Operation Check.'

(4) Power Supply and Program Writing

• If you have finished making the program, supply power to XGB PLC, and use XGB as the parameter and the program.

(5) Input Contact Point Operation Check

• Before switching the operation mode of the PLC to RUN, check the normal operation of the input contact point as follows.

oontaot point ao n							
Input Signal		Contact No).	Operation Check			
Input Signal	XBC XEC		XEC	Operation Check			
Jog normal	Axis X	P0010	%IX0.0.16	Check whether the LED of the contact			
direction	Axis Y	P0011	%IX0.0.17	point turns on while the switch is ON and			
Jog reverse direction	Axis X	P0012	%IX0.0.18	the value of the contact point changes into			
	Axis Y	P0013	%IX0.0.19	1 in the device monitor of XG5000.			

 If the device doesn't work as described in the table above, there might be a problem with the LED or the input hardware, so contact the customer center.

(6) Operation Check through Jog Operation

- Check the operation of XGB positioning doing jog operation in the following sequence.
- This manual describes the axis X operation check when the pulse output mode is PLS/DIR mode and the pulse output level is set as Low Active. Check the operation of axis Y. in the same manner.
 - (a) Check of Normal Direction Rotation of Jog
 - Turn on the normal direction switch(P0010) of axis X, with the reverse direction switch of the jog set at Off.
 - Check whether the XGB positioning function normally generates jog normal direction output.
 - 1) Check of the output LED
 - P0020 (%QX0.0.0): flashes quickly
 - P0022 (%QX0.0.2): stays ON
 - 2) Check of area K
 - Check whether the current position address is increasing by checking the current position address area (axis X: K422 double word) with XG5000.
 - (b) Check of Normal Direction Stop of Jog
 - Turn Off the jog normal direction switch (P0010, %IX0.0.16) during jog normal direction operation, and check whether the output LED (P0020, %QX0.0.0, P0022, %QX0.0.2) is Off, the current position address area (axis X: K422, %KD211 double word) with XG5000, and whether the current position address has stopped increasing.
 - (c) Check of Reverse Direction Rotation of Jog
 - Turn on the axis X jog reverse direction switch (P0012, %IX0.0.18)), with the normal direction switch of the jog Off.
 - · Check whether the XGB positioning function is generating jog reverse direction output normally.
 - 1) Output LED Check
 - P0020(%QX0.0.0): flashes quickly
 - P0022(%QX0.0.2): stays OFF
 - 2) Check of area K
 - Check whether the current position address is decreasing by checking the current position address area (axis X: K422, %KD211 double word) with XG5000
 - (d) Check of Reverse Direction Stop of Jog
 - Turn Off the jog reverse direction switch (P0012, %IX0.0.18) during jog reverse direction operation, and check whether the output LED (P0020, %QX0.0.0, P0022, %QX0.0.2) is Off, the current position address area (axis X: K422, %KD211 double word) with XG5000, and whether the current position address has stopped decreasing
 - (e) For compact standard type, there is not actual output P00040/P00044 and they are indicated by LED.

(7) Finish of Positioning Check

· When you have finished checking whether the jog normal and reverse operation is normally operating through the process above, end the check, make the positioning operation program to be actually used and conduct the positioning operation.

4.2 Making of Operation Check Program

The program for operation check used in this manual should be made as follows.

The positioning parameters should be set as follows.

For setting the positioning parameters, see 3.2.

(1) Positioning Basic Parameters

Items	Range	Set Values	Data Size
Positioning	0 : not used, 1 : used	0	Bit
Pulse output level	0 : Low Active, 1 : High Active	0	Bit
Pulse output mode	0 : CW/CC, 1 : PLS/DIR	1	Bit
M code output mode	0 : NONE, 1 : WITH, 2 : AFTER	0	2 Bit
Bias speed	1 ~ 100,000[pulse/sec.]	1	Double word
Speed limit	1 ~ 100,000[pulse/sec.]	100,000	Double word
Acceleration time 1	0 ~ 10,000[unit: ms]	500	Word
Deceleration time 1	0 ~ 10,000[unit: ms]	500	Word
Acceleration time 2	0 ~ 10,000[unit: ms]	1,000	Word
Deceleration time 2	0 ~ 10,000[unit: ms]	1,000	Word
Acceleration time 3	0 ~ 10,000[unit: ms]	1,500	Word
Deceleration time 3	0 ~ 10,000[unit: ms]	1,500	Word
Acceleration time 4	0 ~ 10,000[unit: ms]	2,000	Word
Deceleration time 4	0 ~ 10,000[unit: ms]	2,000	Word
S/W upper limit	-2,147,483,648 ~ 2,147,483,647 [pulse]	2,147,483,647	Double word
S/W lower limit	-2,147,483,648 ~ 2,147,483,647 [pulse]	-2,147,483,648	Double word
Backlash correction	0 ~ 65,535[pulse]	0	Word
SW upper and lower limit during constant speed operation	0 : not detected, 1 : detected	0	Bit
Use of upper and lower limit	0 : not used, 1 : used	1	Bit

(2) Home return/Manual Operation Parameter

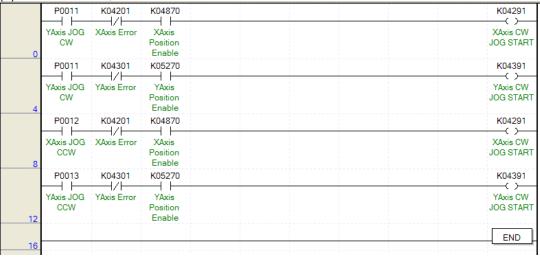
Items	Range	Initial Values	Data Size
Home return method	0 ~2	0	Bit
Home return direction	0 : normal direction, 1 : reverse direction	1	Bit
Origin address	-2,147,483,648~2,147,483,647[pulse]	0	Double word
Home return high speed	1 ~ 100,000[pulse/sec.]	5,000	Double word
Home return low speed	1 ~ 100,000[pulse/sec.]	500	Double word
Home return acceleration time	0 ~ 10,000[unit: ms]	1,000	Word
Home return deceleration time	0 ~ 10,000[unit: ms]	1,000	Word
Dwell time	0 ~ 50,000[unit: ms]	0	Word
JOG high speed	1 ~ 100,000[pulse/sec.]	5,000	Double word
JOG low speed	1 ~ 100,000[pulse/sec.]	1,000	Double word
JOG acceleration time	0 ~ 10,000[unit: ms]	1,000	Word

JOG deceleration time	0 ~ 10,000[unit: ms]	1,000	Word
Inching speed	1 ~ 65,535[pulse/sec.]	100	Word

(3) Example of the Program

The following is an example of the program for positioning check.

(a) In case of XBM, XBC



(b) In case of XEC



Chapter 5 Positioning Instructions

This chapter describes the definitions, functions, use of the positioning instructions used in XGB positioning functions and the program examples.

5.1 Positioning Instruction List

The positioning instructions used for XGB positioning are as follows.

(1) In case of XBC/XBM

Instructions	Description	Conditions	Remark
ORG	Start return to the origin	Slot, instruction axis	5.2.1
FLT	Set floating origin	Slot, instruction axis	5.2.2
DST	Direct starting	Slot, instruction axis, position, speed, dwell time, M code, control word	5.2.3
IST	Indirect starting	Slot, instruction axis, step number	5.2.4
LIN	Linear interpolation starting	Slot, instruction axis, step number, axis information	5.2.5
SST	Simultaneous starting	Slot, instruction axis, axis X step, axis Y step, axis Z step, axis information	5.2.6
VTP	Speed/position switching	Slot, instruction axis	5.2.7
PTV	Position/speed switching	Slot, instruction axis	5.2.8
STP	Stop	Slot, instruction axis, deceleration time	5.2.9
SSP	Position synchronization	Slot, instruction axis, step number, main axis position, main axis setting	5.2.10
SSS	Speed synchronization	Slot, instruction axis, synchronization rate, delay time	5.2.11
POR	Position override	Slot, instruction axis, position	5.2.12
SOR	Speed override	Slot, instruction axis, speed	5.2.13
PSO	Positioning speed override	Slot, instruction axis, position, speed	5.2.14
INCH	Inching starting	Slot, instruction axis, inching amount	5.2.15
SNS	Change starting step number	Slot, instruction axis, step number	5.2.16
MOF	Cancel M code	Slot, instruction axis	5.2.17
PRS	Preset current position	Slot, instruction axis, position	5.2.18
EMG	Emergency stop	Slot, instruction axis	5.2.19
CLR	Reset error, cancel output inhibition	Slot, instruction axis, inhibit/allow pulse output	5.2.20
WRT	Save parameter/operation data	Slot, instruction axis, select the storage area	5.2.21
PWM	Pulse width modulation	Slot, instruction axis, output cycle, off duty rate	5.2.22

[•] XGB positioning instructions are activated at the rising edge. That is, when the execution contact point is On, it carried out the instruction only once. (PWM instruction is activated at the "On" level)

(2) In case of XEC

(2) In case of Function Block	Description	Conditions	Remark
APM_ORG	Start return to the origin	Req, Base, Slot, Axis	5.3.2
APM_FLT	Set floating origin	Req, Base, Slot, Axis	5.3.3
APM_DST	Direct starting	Req, Base, Slot, Axis, Position, speed, dwell time, M code, position/speed, absolute/incremental, ACC/DEC time	5.3.4
APM_IST	Indirect starting	Req, Base, Slot, Axis, step number	5.3.5
APM_LIN	Linear interpolation starting	Req, Base, Slot, Axis, step number	5.3.6
APM_SST	Simultaneous starting	Req, Base, Slot, Axis, X axis step, Y axis step, Z axis step	5.3.7
APM_VTP	Speed/position switching	Req, Base, Slot, Axis	5.3.8
APM_PTV	Position/speed switching	Req, Base, Slot, Axis	5.3.9
APM_STP	Stop	Req, Base, Slot, Axis, ACC/DEC time	5.3.10
APM_SSP	Position synchronization	Req, Base, Slot, Axis, Step number, main axis, Main axis position	5.3.11
APM_SSSB	Speed synchronization	Req, Base, Slot, Axis, main axis, rate of sub-axis, delay time	5.3.12
APM_POR	Position override	Req, Base, Slot, Axis, position	5.3.13
APM_SOR	Speed override	Req, Base, Slot, Axis, speed	5.3.14
APM_PSO	Positioning speed override	Req, Base, Slot, Axis, position, speed	5.3.15
APM_INC	Inching starting	Req, Base, Slot, Axis, inching amount	5.3.16
APM_SNS	Change starting step number	Req, Base, Slot, Axis, step number	5.3.17
APM_MOF	Cancel M code	Req, Base, Slot, Axis	5.3.18
APM_PRS	Preset current position	Req, Base, Slot, Axis, position	5.3.19
APM_EMG	Emergency stop	Req, Base, Slot	5.3.20
APM_RST	Reset error, cancel output inhibition	Req, Base, Slot, Axis, Enable/Disable pulse output	5.3.21
APM_WRT	Save parameter/operation data	Req, Base, Slot, Axis, Select area to save	5.3.22
APM_PWM	Pulse width modulation	Reg, Slot, Axis, output cycle, off duty rate	5.3.23

5.2 Details of Positioning Instructions (In case of XBC/XBM)

5.2.1 Origin Return Instructions

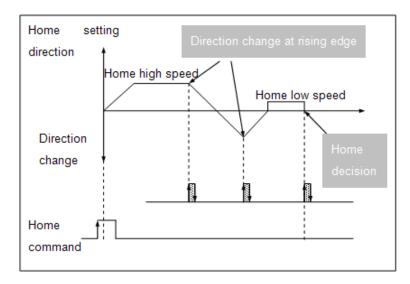
• Origin return is sued to check the origin of the machine when power is supplied to the machine in general. If the origin return instruction is given, it is executed depending on the setting of the origin return parameter. (for setting of the origin return parameter, refer to 3.2.4.)

Туре	Items	Description	Remark
	origin return method	Set origin return method	
	origin return direction	Starting direction during origin return operation	
	Origin address	origin address in detecting origin	
origin return	origin return speed	high/low speed during origin return operation	
parameter	origin return dec./acc. time	dec./acc. time during origin return operation	
	origin return deceleration time	Set deceleration time during origin return operation	
	DWELL time	Time it takes to remove remaining pulse of the deviation counter right after origin return is finished	

• In general, the origin return divides into two ways, one of which is using the DOG and the other is not using it. In XGB positioning function, the following three ways can be used that use the DOG. (for details of the origin return method, refer to 3.1.9.)

Origin return method	Necessary input signals	Remark
Detect origin after DOG turns Off (0: DOG/origin (OFF))	DOG signal, origin signal	
When DOG is On, detect the origin after deceleration . (1: DOG/origin (On))	DOG signal, origin signal	() is what is displayed in the positioning origin/manual parameter.
Detect the origin by DOG (2: DOG)	DOG signal	

• The following diagram is an example of origin detection by DOG among the three ways of origin return.



(1) Origin return Instruction (ORG)

							Ava	ilable	e area	as							Flag				
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)		
ORG	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-	4~7	0	_	_		
	ax	0	-	0	-	-	-	0	-	-	0	-	-	0	-						
ORG COMMAND										OR	G s	sl ax									

[Area seting]

	<u> </u>		
Operand	Description	Setting range	Data size
sl	Slot number where positioning modules are mounted	XGB is fixed at 0.	WORD
ax	The axis to give instructions	0(axis X) or 1(axis Y)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is for carrying out the origin return of the XGB built-in positioning function.
- It gives the origin return instruction to the axis designated as the ax of positioning built in XGB at the rising edge of the input condition.
- When origin return is completed, the origin setting bit (axis X:K4204,axis Y:K4304) turns On and the current address is preset at the address value set in the origin return parameter.

(s) Error

- If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.
- This is an error of instruction execution, so the error flag (axis X:K4201,axis Y: K4301) of area K for positioning does not turn On.

(2) Related Device Alarm

• The parameters and area K devices related to ORG instructions are as follows.

Pa	rameter		Data size		
Item	Setting range	axis X	axis Y	Properties	Dala Size
origin return method	0 : DOG/Home(Off) 1 : DOG/Home(On) 2 : DOG	K4780 K4781	K5180 K5181	Read/write	2 bit
origin return direction	0 : CW, 1 : CCW	K4782	K5182	Read/write	Double word
Origin address	-2,147,483,648~ 2,147,483,647[pulse]	K469	K509	Read/write	Double word
origin return high speed	1 ~ 100,000[pps]	K471	K511	Read/write	Double word

Pa	rameter				
Item	Setting range	Data size	axis Y	Properties	Data size
origin return low speed	1 ~ 100,000[pps]	K473	K513	Read/write	Double word
origin return acceleration time	0 ~ 10,000[ms]	K475	K515	Read/write	Word
origin return deceleration time	0 ~ 10,000[ms]	K476	K516	Read/write	Word
Dwell time	0 ~ 50,000[ms]	K477	K517	Read/write	Word

(3) Examples of Instructions

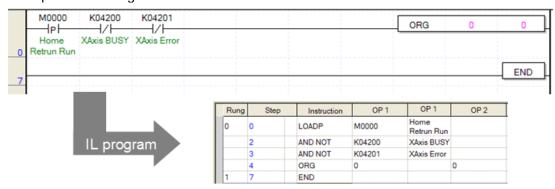
- The origin return instructions are described as follows with the examples of the parameters and programs.
- The examples of the ORG instructions are described on the basis of axis X.

(a) Parameter Setting

Param		
Item	Value	
origin return method	1: DOG /origin(On)	
origin return	1: reverse	***************************************
direction	direction	
Origin address	0	
origin return high speed	50,000[pps]	Home Parameter
origin return low speed	500[pps]	
origin return acceleration time	100[ms]	
origin return deceleration time	100[ms]	
Dwell time	100[ms]	

	Home Method	1: DOG/HOME(ON)
	Home Direction	1: CCW
	Home Address	0 pls
	Home High Speed	5000 pls/s
•	Home Low Speed	500 pls/s
	Homing ACC Time	100 ms
Home "" Parameter ""	Homing DEC Time	100 ms
i arameter	DWELL Time	100 ms

(b) Examples of the Program

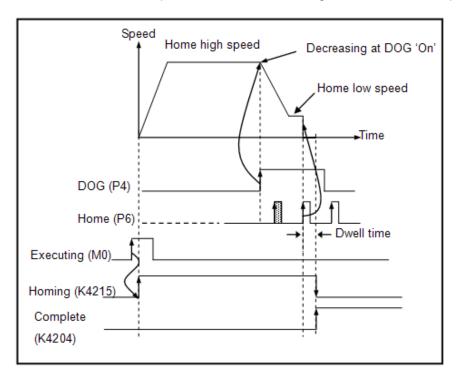


(c) Devices Used

Device	Description
M0000	Starting signal of axis X origin return
K4200	Signal during axis X operation
K4201	axis X error

(d) Program Operation

- The ORG instruction is executed when there is the rising edge of M0000 which was used as the starting signal of the axis X origin return.
 - (It doesn't work if axis X is operating or in error)
 - 1) If the origin return instruction (ORG instruction) is executed, it is decelerated in the reverse direction as set in the origin return parameter and operates at origin return high speed (50,000pps).
 - 2) If there is the rising edge of the DOG signal during origin return high speed operation, it is decelerated and operates at origin return low speed (500pps). The deceleration time is 100ms, set in the parameter.
 - 3) If the origin signal is input, which is the external input signal, after switch to the origin return low speed, the output immediately stops, and the origin determining status flag (K4204 bit) turns On after the dwell time (100ms).
 - (There may be a delay as long as 'dwell time + 1 scan time' until the origin determining status flag (K4204 bit) turns On after the output stops.)
 - 4) Then the current address is preset at 0, which is the origin address set in the parameter.



The DOG signal and origin signal are respectively fixed as the following contact points.

	Standa	rd	Compact star	ct standard/high-end type		
	DOG	origin	DOG	origin		
axis X	P0004	P0005	P000C	P000D		
axis Y	P0006	P0007	P000E	P000F		

- If the contact points of the DOG and the origin input are used together as the external preset input of the high speed counter, or together as the starting signal of the external contact point task, the origin detection might be inaccurate.
- The current position address does not change during origin return.

5.2.2 Floating Origin Setting Instruction

- · Floating origin setting refers to setting the current position as the origin by force with the instruction without carrying out the actually mechanical origin return.
- (1) Floating origin Setting Instruction (FLT)

	Areas available									Flag									
Instruc	ction	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
FLT	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-	4~7	0	-	_
	ах	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
FLT COMMAND FLT SI ax																			

[Area Setting]

	01		
Operand	Description	Setting range	Data size
sl	Slot number where positioning module is mounted	XGB is fixed at 0	WORD
ax	Axis to give instruction	0(axis X) or 1(axis Y)	WORD

[Flag Set]

Ī	Flag	Description	Device number
	Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is for setting the floating origin to the XGB built-in positioning.
- The instruction of setting the floating origin is given to the axis designated as ax of XGB positioning at the rising edge of the input condition.
- If the instruction is carried out, the current position address becomes 0, and the origin determining bit (axis X: K4204,axis Y:K4304) turns On.

(b) Error

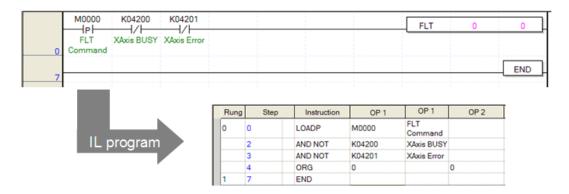
• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed

- Floating origin setting presets the current position at 0 and only fixs the origin, so you need to note the following when you use the instruction of setting the floating origin.
 - → Check whether there is an error before carrying out the floating origin setting instruction. If there is an error, remove the cause of the error, reset the error (CLR instruction) and terminate the output inhibition.
 - → Now set the floating origin, change the step number to operate into the starting step change instruction (SNS), and then get it started.

(2) Example of Use of the Instruction

- The floating origin setting instruction is described with the example of the following program.
- The example of use of the FLT instruction is described on the basis of axis X.

(a) Example of the Program



(b) Device Used

Device	Description
M0000	axis X floating origin instruction signal
K4200	Signal during axis X operation
K4201	axis X error

(c) Operation of the Program

- The FLT instruction is executed when there is the rising edge of M0000, which was used as axis X floating origin instruction signal.
 - (Not if axis X is operating or in error)
- If the FLT instruction is executed, the origin is fixed right away at the current position differently from the origin return, the origin determining signal (axis X:K4204) turns On, and the current address is preset at 0.

5.2.3 Direct Starting Instruction

Direct starting refers to designating the operation data of the target position and speed from the
positioning instruction (DST instruction) for operation without using the setting of the step set in the
positioning operation data.

(1) Direct Starting Instruction (DST)

							Area	as a\	/ailab	le								Flag	
Instruc	ction	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step		Zero (F111)	Carry (F112)
	sl	-	ı	-	-	-	-	-	-	-	0	-	-	-	-				
	ax	0	ı	0	ı	-	-	0	-	-	0	-	-	0	-				
	n1	0	ı	0	ı	-	-	0	-	-	0	-	-	0	-				
DST	n2	0	-	0	1	-	-	0	-	-	0	-	-	0	-	4~7	0	-	-
	n3	0	1	0	-	-	-	0	-	-	0	-	-	0	-				
	n4	0	ı	0	ı	-	-	0	-	-	0	-	-	0	-				
	n5	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
DST	DST COMMAND								—[DST		sl	ax	n1	n2	n3 r	n4 n5]

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Target position	-2,147,483,648~2,147,483,647[Pulse]	DINT
n2	Target speed	1~100,000[pps]	DWORD
n3	dwell time	0~50,000[ms]	WORD
n4	M code number	M code (0~65,535)	WORD
n5	Control word	See '(a) function'	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is for directly ordering the start to XGB built-in positioning.
- This instruction carries out direct starting of the axis designated as ax of XGB positioning at the rising edge of input condition.
- If the instruction is executed, positioning operation is started by using the target position set in n1, the target speed set in n2, the dwell time set in n3, and the M code number set in n4 instead of the operation data set in the step number (axis X:K426, axis Y:K436 word) of area K.
- The absolute/Incremental coordinates, position/speed control and acceleration/deceleration pattern number are fixed by the setting of each bit of the control word set as n5.

Bit number	F	E	D	С	В	Α	9	8	7	6	5	4	3	2	1	0
Setting item	Not used									Acc./de	c. time	coordinates setting	Not used		ed	control method
Setting	_							0: 1, 1:2		0: absolute	te			0: position		
range										2:3,	3:4	1: ncremental		1: speed		

- The instruction only sets the item of the operation data, and the basic parameter items related to the operation such as the bias speed and speed limit are fixed in the positioning basic parameters.
- If you use the DST instruction, the operation pattern is fixed as End operation, and the operation method is fixed as the single operation. But if continued operation or repeated operation is needed, use indirect starting (IST instruction).

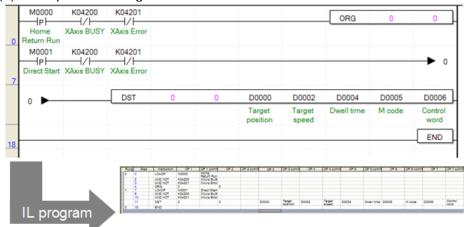
(b) Error

- If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.
- · This case if an error of execution of the instruction, so the error of positioning area K flag (axis X:K4201, axis Y: K4301) does not turn On.

(2) Example of Use of the Instruction

- Direct starting instruction is described with the example of the following program.
- The example of use of the DST instruction is described on the basis of axis X.

(a) Example of the Program



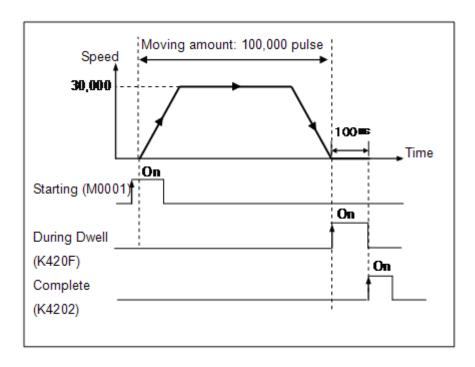
(b) Device Used

Device	Description	Data size	Example of setting
M0000	axis X origin return instruction signal	BIT	-
M0001	axis X direct starting instruction signal	BIT	-
K4200	signal during axis X operation	BIT	-
K4201	axis X error	BIT	-
D0000	Target position	DINT	100,000
D0002	Target speed	DWORD	30,000
D0004	Dwell time	WORD	100
D0005	M code number	WORD	123
D0006	Control word	WORD	H'20 [※]

H'20: Bit5~6: 1 (No.2 acceleration/deceleration pattern), Bit 4: 0 (absolute coordinates),

Bit0: 0(position control)

- (c) Operation of the Program
 - If there is the rising edge of M0001 used as the direct starting instruction signal of axis X, the DST instruction is executed.
 - (Not if axis X is operating or in error.)
 - If the origin is not fixed when the DST is started, error code 224 will appear and operation will not occur. In such a case, turn on M0000, execute the ORG instruction and thereby carry out the origin return, and start the DST instruction.
 - 1) If the DST instruction is executed, the positioning operation gets started as set in the operand as follows.
 - Since sl and ax are 0, built-in positioning axis X is started.
 - The target position will be 100,000 pulse set as double word in D0002.
 - The target speed will be 30,000 pps set as double word in D0002.
 - After positioning is finished, the dwell time becomes 100ms set in D0004, and No.123 designated in D0005 will be output as the M code.
 - Since the control word of D0006 is H'20, the acceleration/deceleration pattern will follow the acceleration time 2 and deceleration time 2 of the basic parameter, and the positioning operation will be done as the absolute coordinates. If the DST instruction is started, the position control will be executed in the absolute coordinates, it will operate up to the 100,000 pulse at 30,000 pps, then stop, and after the dwell time of 100 ms passes, the positioning is finished, and M code outputs 123.
 - 2) If positioning is finished by direct starting, positioning finish signal (axis X:K4202) turns on for a scan.



5.2.4 Indirect Starting Instruction

· Indirect starting refers to execution of the positioning operation by using the operation step data set in the positioning operation data.

(1) Indirect Starting Instruction (IST)

							Area	as av	/ailab	le								Flag	
Instruction		PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-				
IST	ax	0	-	0	-	-	-	0	-	-	0	-	-	0	-	4~7	0	-	-
	n1	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
IST COMMAND IST SI ax n1																			

[Area Setting]

	01		
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Step number to start	0~30(standard), 0~80(advanced)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

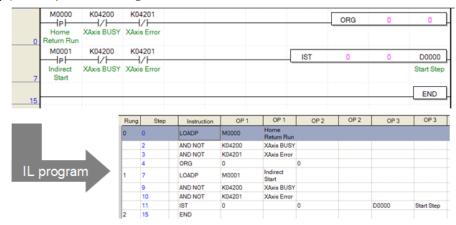
- This instruction is giving indirect starting instruction to XGB built-in positioning.
- The indirect starting is executed to the axis designated as ax of XGB positioning at the rising edge of the input condition.
- If the instruction is executed, the positioning operation is carried out by the operation data set in the step number of area K designated in n1. If n1 is set at 0, the operation step is executed which is displayed in the step number of current positioning area K (axis X:K426, axis Y:K436 word).
- · Various operation patterns such as end, continued, and incessant operation, and single and repeated operation can be made and executed by using the indirect operation instruction.

(b) Error

- If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.
- In this case, execution of instruction is error. so K area error ocurrence Flag(X axis:K4201, Y axis:K4301) doesn't turn On
- · If the set value of the starting step number gets out of the settable range, instruction Error Flag(F110) is not set, the error flag of positioning area K (axis X:K4201, axis Y: K4301) turns On, and the operation does not occur.

Chapter 5 Positioning Instructions

- (2) Example of Use of the Instruction
 - The indirect starting instruction is described with the example of the following program.
 - The example of use of the IST instruction is described on the basis of axis X.
- (a) Example of the Program



(b) Device Used

Device	Description	Data size	Example of setting
M0000	axis X origin return instruction signal	BIT	-
M0001	axis X indirect starting instruction signal	BIT	-
K4200	signal during axis X operation	BIT	-
K4201	axis X error	BIT	-
D0000	Starting step number	WORD	3

	Step No.		Operatio n pattern		•	Repeat ed Step	Target position [Pulse]	M code	Acc./dec . No.	Operation speed[pls/s]	Dwell time [ms]
I	3	Increm ental	end	position	single	0	7,000	0	1	100	10

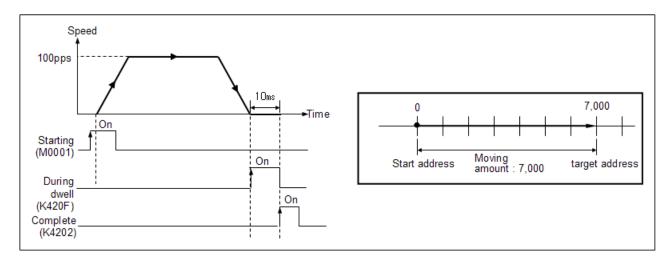
(c) Operation of the Program

• If there is the rising edge of M0001 used as the axis X indirect starting instruction signal, the IST instruction is executed.

(Not if axis X is operating or in error.)

- If the origin is not fixed when the DST is started, error code 224 will appear and operation will not occur. In such a case, turn on M0000, execute the ORG instruction and thereby carry out the origin return, and start the DST instruction.
 - 1) If the direct starting instruction (IST instruction) is executed, positioning operation starts as set in the operand as follows.
 - Since sl and ax are 0, built-in positioning axis X of the basic unit is started.
 - Because the starting step number is set as 3, positioning operation is carried out by the data of No. 3 step of the positioning operation data. That is, if the IST instruction is started, positioning control is conducted in the Incremental coordinates as set in operation data No. 3 step, moves up to 7,000 pulse at 100pps, stops, and when the dwell time of 10ms passes, positioning is finished.

2) Since M code is set at 0, it does not appear and as the operation pattern is End, the step number (axis X:K426) of area K is changed into 4, which is step + 1.



- · In addition to executing indirect operation by using the IST instruction, indirect starting can also be started by using the starting signal instruction contact point (axis X:K4290, axis Y:K4390) of
 - → If starting is done by using the starting signal instruction contact point, the operation step is fixed at the current operation step number (axis X:K426, axis Y:K436).
 - → Therefore if you want to change the operation step when starting by using the starting signal instruction contact point, change the operation step by using the Starting step number changing instruction and turn on the starting instruction contact point.
- For details, refer to 3.4.2.

5.2.5 Straight Interpolation Starting Instruction

- Straight interpolation starting refers to the operation so that the path of axes X and Y is straight from the starting address (current stop location) to the target address (target address).
- Straight interpolation control divides into control by absolute coordinates and Incremental coordinates. For details, refer to 3.1.2.
- When the instruction of straight interpolation starting is given, the axis where there is more movement is designated as the main axis. If the movements are equal, axis X is the main axis.
- The speed of the auxiliary axis does not follow the setting of the operation data, but conducts operation by calculating the operation speed, acceleration time, deceleration time, and bias speed automatically by the following operations.

auxiliary axis speed = main axis speed × auxiliary axis distance
main axis distance

main axis: the axis where there is more movement of positioning
 auxiliary axis: the axis where there is less movement of positioning

• The operation pattern that can use straight interpolation operation is limited to End and Continued operation. If the main axis is set as Continued and the interpolation operation is started, no error is issued in XGB built-in positioning but the operation pattern of the main axis is changed into Continued. If the auxiliary axis is set as Continued, it does not affect the straight interpolation.

(1) Straight Interpolation Starting Instruction (LIN)

							Area	as av	/ailab	le							Flag			
Instruction		PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)	
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-					
LIN	ax	0	•	0	-	-	•	0	-	-	0	•	-	0	•	4~7	47		_	
LIIN	n1	0	-	0	_	-	-	0	-	-	0	-	-	0	-		0	-	-	
	n2	0	-	0	-	-	-	0	-	-	0	-	-	0	-					
LIN COMMAND LIN SI ax n1 n2																				

[Area Setting]

Operand	Description	Setting range	Data size		
sl	Slot number of positioning module	XGB is fixed at 0	WORD		
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD		
n1	Step number to carry out straight interpolation	0~30(standard), 0~80(advanced)	WORD		
n2	Set the axis to carry out straight interpolation	XGB is set at 3	WORD		

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is giving the straight interpolation starting instruction to XGB built-in positioning.
- The two axes of XGB positioning conduct straight interpolation starting at the rising edge of input condition.
- If the instruction is executed, the two axes of XGB positioning carried out the straight interpolation operation according to the axis setting designated in n2. The step number to be operated is the step number set in n1.

• In setting of the axis of n2, the axis to carry out the straight interpolation operation as follows.

Bit number	15 ~ 3	2	1	0
Setting	Not used	Axis Z (XGB is not	axis Y	axis X
		used)		

- Each bit refers to the axis to start the straight interpolation. In the case of XGB built-in positioning, n2 should be fixed as 3 since only axis X and axis Y are available. Otherwise, error code 253 is issued and it does not operate.

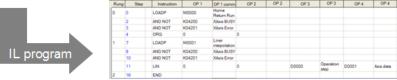
(b) Error

- If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.
- Since this case if an error of execution of the instruction, the error in positioning area K error flag(axis X:K4201, axis Y: K4301) does not turn On..
- If the set value of the starting step number gets out of the settable range, instruction Error Flag(F110) is not set, the error flag of positioning area K (axis X:K4201, axis Y: K4301) turns On, and the operation does not occur.

(2) Example of Use of the Instruction

(a) Example of the Program





(b) Device Used

Device	Description	Data size	Example of setting
M0000	axis X origin return instruction signal	BIT	-
M0001	Interpolation starting instruction signal	BIT	-
K4200	signal during axis X operation	BIT	-
K4201	axis X error	BIT	-
D0000	Operation step number	WORD	10
D0001	Axis information	WORD	3

Axis	Step No.	coordi nates	Operatio n pattern	Control method	Operatio n mode	Repeat ed Step	Target position [Pulse]	M code	Acc./dec. No.	Operation speed[pls/s]	Dwell time [ms]
Х	10	Rel.	End	positio n	Single	0	7,000	0	1	100	10
Y	10	Rel.	End	positio n	Single	0	2,000	0	2	300	10

(c) Operation of the Program

- The LIN instruction is executed if the rising edge of M0001 is generated which was used as the instruction signal of the straight interpolation starting.
 - (If it is in operation of axis X or in error, it does not operate. If axis Y is in operation, error code 242 is issued and it does not operate)
 - 1) If the straight interpolation instruction (LIN instruction) is executed, the straight interpolation operation is started as set in operand.
 - 2) Since sl is 0, built-in positioning of the basic unit operates straight interpolation.
 - Because the starting step number is set as 3, positioning operation is carried out by the data of No. 3 step of the positioning operation data. That is, if the IST instruction is started, positioning control is conducted in the Incremental coordinates as set in operation data No. 3 step, moves up to 7,000 pulse at 100pps, stops, and when the dwell time of 10ms passes, positioning is finished.
 - 3) As the ax is set at 0, the straight interpolation instruction for axis X is started. (For actual zero, the main and auxiliary axes of axis X and axis Y are calculated according to the size of the target position for starting, to the ax operand does not affect the operation)
 - 4) Since the step number of n1 operation is set at 10, the main and auxiliary axes are automatically selected by No. 10 operation data of axis X and axis Y. (In this example, because the target position of axis X is larger, axis X is the main axis and axis Y is the auxiliary axis.)
 - 5) The acceleration and deceleration time and speed of axis Y, which is the auxiliary axis, does not follow the set value but automatically calculated for operation.
 - 6) That is, axis X and axis Y are designated as the main and auxiliary axes respectively by starting of the LIN instruction, it moves by (7000,2000) to the relative position and the operation ends.

5.2.6 Simultaneous Starting Instruction

• The simultaneous starting instruction (SST instruction) is for simultaneously starting the steps of the axes set in the instruction. For details, refer to 3.1.7.

(1) simultaneous starting instruction (SST)

							Area	as av	/ailab	le							Flag		
Instruc	ction	PMK F L T C S Z D.x R.x stan U N D F					R	Step	Error (F110)	Zero (F111)	Carry (F112)								
	sl	-	-	•	-	-	-	-	-	-	0	-	-	-	-				
	ax	0	1	0	-	-	-	0	-	-	0	-	-	0	-				
SST	n1	0	ı	0	ı	-	-	0	-	-	0	1	-	0		4~7			
331	n2	0	•	0	ı	-	-	0	-	-	0	•	-	0	1	4~1	0	-	-
	n3	0	-	0	-	-	-	0	-	-	0	-	-	0	1				
	n4	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
	COMMAND																		
SST	-		-		\dashv							SST	-	sl	ax	n1	n2 r	n3 n4	$\rfloor - \vert$

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	axis X Step No.	0~30(standard), 0~80(advanced)	WORD
n2	axis Y Step No.	0~30(standard), 0~80(advanced)	WORD
n3	axis Z Step No.	Not used	WORD
n4	Axis setting	XGB is set at 3	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This function is for giving the simultaneous starting instruction to XGB built-in positioning simultaneous starting.
- The two axes of XGB positioning are simultaneously started at the rising edge of the input condition. (For the difference between using the simultaneous starting instruction and starting the two axes consecutively in the PLC ladder program, refer to 3.1.7.)
- When the instruction is executed, axis X and axis Y simultaneously start by using the operation data of the step number set in n1 and n2 respectively. XGB built-in positioning does not have axis Z, so the set value of n3 does not affect the operation.
- · Axis setting of n4 sets the axis to carry out simultaneous starting by bit as follows.

Bit No.	15 ~ 3	2	1	0
Setting	Not used	Axis Z (XGB not used)	axis Y	axis X

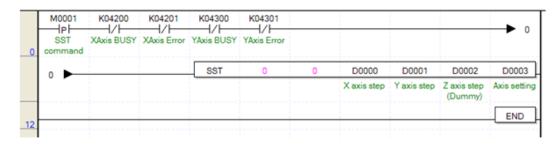
- Each bit refers to the axis to start straight interpolation. In the case of XGB built-in positioning, only axis X and axis Y are available, so n4 should be fixed at 3. Otherwise, error code 296 is issued and operation does not occur.

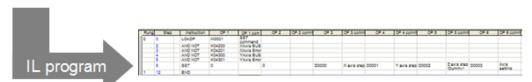
- If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.
- Since this case if an error of execution of the instruction, the error in positioning area K error flag(axis X:K4201, axis Y: K4301) does not turn On..
- If the set value of the starting step number gets out of the settable range, instruction Error Flag(F110) is not set, the error flag of positioning area K (axis X:K4201, axis Y: K4301) turns On, and the operation does not occur.

(2) Example of Use of the Instruction

• The instruction is described with the example of the following program simultaneous starting instruction.

(a) Example of the Program





(b) Device Used

Device	Description	Data size	Example of setting
M0001	simultaneous starting instruction signal	BIT	-
K4200	signal during axis X operation	BIT	-
K4201	axis X error	BIT	-
K4300	signal during axis Y operation	BIT	-
K4301	axis Y Error	BIT	-
D0000	axis X operation Step No.	WORD	1
D0001	axis Y operation Step No.	WORD	2
D0002	axis Z operation Step No.	WORD	-
D0003	Axis setting	WORD	3

Axis	Step No.	coordin ates	Operatio n pattern	Control method	Operat ion mode	Repeat ed Step	Target position [Pulse]	M code	Acc./dec. No.	Operation speed[pls/s]	Dwell time [ms]
Х	1	Rel.	End	position	Singl e	0	7,000	0	1	100	10
Υ	2	Rel.	End	Position	Singl e	0	2,000	0	2	300	10

(c) Operation of the Program

- SST instruction is executed it the rising edge of M0001, which was used as the instruction signal of the simultaneous starting is generated.
 - 1) If the simultaneous starting instruction (SST) is executed, the two axes are simultaneously started as set in the operand as follows.
 - 2) Since sl is 0, built-in positioning of the basic unit operates simultaneous starting.
 - 3) If the set value of ax does not exceed the setting range, it does not affect the operation.
 - 4) Since the step numbers of axis X and axis Y are set 1 and 2 respectively, the two axes are simultaneously started by using the operation data of the operation step.
 - 5) Since there is no axis Z in XGB built-in positioning, even if a random value is input as the step number of axis Z operation, the operation is not affected.

5.2.7 Speed Position Switching Instruction

• This is positioning according to the target position by switching the axis operated by speed control to position control through speed/position switching instruction (VTP instruction). For details, refer to 3.1.4.

(1) Speed/Position Switching Instruction (VTP)

		Areas available														Flag			
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
VTP	sl	-	-	-	-	-	-	-	-	-	0	•	-	-	-	4~7			
VIP	ax	0	-	0	-	ı	-	0	-	-	0	-	-	0	-	4~7	0	-	-
COMMAND										VTf		sl ax							

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is giving the speed/position control switching instruction to XGB built-in positioning.
- The axis designated as ax at the rising edge in the input condition is switched from the speed operation to position operation.
- The current position which was output during the previous speed control operation is initialized to 0 and operated to the target position by absolute coordinates method.

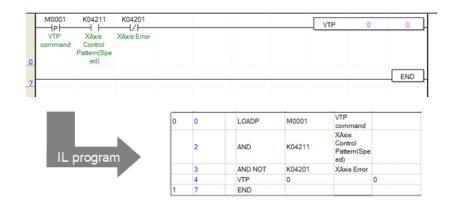
(b) Error

 If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

• The program speed/position control switching instruction is described with the following example.

(a) Example of the Program



Chapter 5 Positioning Instructions

(b) Device Used

Device	Description	Data size	Example of setting
M0001	speed/position switching instruction signal	BIT	-
K4211	Signal during axis X speed control	BIT	-
K4201	axis X error	BIT	-

(c) Operation of the Program

- VTP instruction is executed when there is the rising edge of M0001, which was used as the speed/position switching instruction signal.
- It the speed control is going on currently, it is switched into position control, the current position is preset to 0, and position control is carried out up to the target position. Now the target position divides into the following cases according to the direct and indirect starting.
 - 1) In case of indirect starting, the target position of the operating step becomes the target position after the speed position switching.
 - 2) In case of direct starting, the target position set as the operand in the DST instruction becomes the target position after the speed position switching
- When using the speed/position switching instruction, make sure that the instruction is not executed during the position operation by using the display flag (axis X:K4211, axis Y:K4311) during speed control as the program example above.

5.2.8 Position Speed Switching Instruction

• This is operation by switching the axis operating by the current position control into speed control by the position/speed switching instruction (PVT instruction). For details, refer to 3.1.5.

(1) Position/Speed Switching Instruction (PTV)

			Areas available														Flag		
Instruction		РМК	F	L	Т	С	S	Z	D.x	R.x	Cons tant	С	Z	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
DTV	sl	-	1	-	-	-	-	-	-	-	0		-	-	1	4 7	_		
PTV	ах	0	ı	0	-	1	-	0	-	-	0	1	-	0	1	4~7	0		-
PTV COMMAND PTV SI ax																			

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is giving the position/speed control switching instruction to XGB built-in positioning.
- The axis designated as ax at the rising edge in the input condition is switched from the position operation to speed operation.
- The current position which was output during the previous speed control operation is not initialized to 0 and only the control method is switched to speed control with the operation continued.

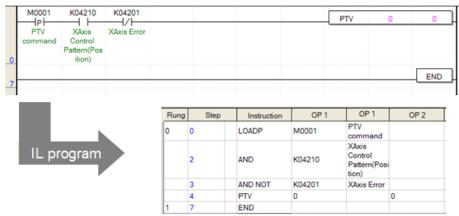
(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

 The position/speed control switching instruction is described with the example of the following program.

(a) Example of the Program



Chapter 5 Positioning Instructions

(b) Device Used

Device	Description	Data size	Example of setting
M0001	position/speed switching instruction signal	BIT	-
K4210	signal during axis X position control	BIT	-
K4201	axis X error	BIT	-

(c) Operation of the Program

- PVT instruction is executed when there is the rising edge of M0001, which was used as the position/speed switching instruction signal.
- It the position control is going on currently, it is switched into speed control, and the current position is not preset but only the control method is switched to speed control.
- When using the position/speed switching instruction, make sure that the instruction is not executed during the speed operation by using the display flag (axis X:K4210, axis Y:K4310) during position control as the program example above.
- To stop the operation after switching to speed control, use the stop instruction (STP).

5.2.9 Deceleration Stop Instruction

- The currently operating axis is decelerated and stopped at the speed designated by the deceleration stop instruction (STP instruction). For details, refer to 3.1.11.
- (1) Deceleration Stop Instruction (STP)

							Area	as av	/ailab	le							Flag		
Instruc	tion	PMK	F	L	۲	O	Ø	Z	D.x	R.x	con stan t	כ	Z	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-			-	-
STP	ах	0	-	0	-	-	-	0	-	-	0	-	-	0	-	4~7	4~7 0		
	n1	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
STP			_	_	_	(СОМ	MAN	ID					-[S	TP	sl	ax n1]

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	deceleration time	0(immediate stop) 1~65,535(default)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is giving the deceleration stop instruction to XGB built-in positioning.
- The designated axis of instruction works at the rising edge of the input signal.
- In case n1 is 0
- It stops right away without deceleration in XGB internal positioning.
- In this case, note that there might be shock noise or damage to the motor.
- In case n1 is 1~65535
 - the deceleration time do not follow by n1 setting.
 - It stops according to the operation data of the acceleration/deceleration number. (For example, In DST operation STP deceleration time is followed by Acc./dec. number in DST. In IST operation, STP deceleration time is followed by Acc./dec. number in operation data.)

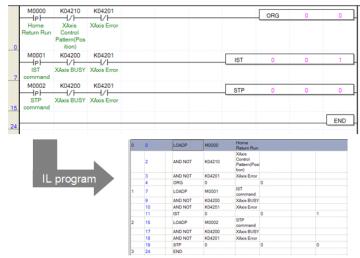
(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

The deceleration stop instruction is described with the example of the following program.

(a) Example of the Program



(b) Device Used

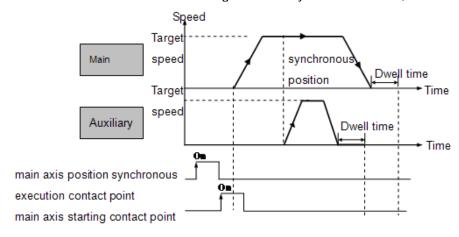
Device	Description	Data size	Example of setting
M0000	origin return instruction signal	BIT	-
M0001	Indirect starting instruction signal	BIT	-
M0002	Deceleration stop instruction signal	BIT	-
K4200	signal during axis X position control	BIT	-
K4201	axis X error	BIT	-

(c) Operation of the Program

- IST instruction is executed when there is the rising edge of M0001, which was used as the indirect starting instruction signal.
- In the program above, the indirect starting of No. 1 step of axis X is executed.
- If there is the rising edge of M0002, which is the deceleration stop instruction signal during operation, the deceleration stop instruction is executed according to the setting of STP instruction.
 - Since sl (first Operand) and ax(second Operand) are set at 0, the deceleration stop is executed for axis X of basic unit built-in positioning.
 - Since the deceleration time is set at 0, if the STP instruction is executed, it stops right away without deceleration.
- Note the following in executing the STP instruction.
 - If it has been stopped by the deceleration stop instruction, because the positioning operation has not been finished to the set target position, no positioning completion signal (axis X:K4202, axis Y:K4302) is generated, and if M code is set, the M code signal does not turn On either.
 - In this case, the operation step number maintains the current step.
 - If the indirect starting instruction is executed again afterwards, the operation methods differs according to the coordinates type.
 - 1) Absolute coordinates: The remaining position output which has not been output from the current operation step is output.
 - 2) Incremental coordinates: Operation is conducted as much as the new target position.
 - For example, if the target value of the corresponding step is 20,000 and it has been stopped at 15,000 by the deceleration stop instruction, and if the indirect starting is executed again, in case of absolute coordinates, operation is done as much as 5,000 and stops at 20,000, and in case of Incremental coordinates, it newly moves 20,000 and stops at 35,000.

5.2.10 Main axis position synchronous Instruction

• As follows, this is the instruction for synchronous starting according to the current position of the main axis with the axis set in the SSP being the auxiliary axis. For details, refer to 3.1.8.



(1) Main axis position synchronous Starting Instruction (SSP)

							Area	as a\	/ailab	le							Flag		
Instruction		PMK	F	L	Т	С	s	Z	D.x	R.x	Cons tant	J	Ν	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	ı	-	-	-				
	ax	0	1	0	-	_	-	0	-	-	0	ı	-	0	-			-	-
SSP	n1	0	ı	0	-	-	-	0	-	-	0	Ī	-	0	-	4~7	0		
	n2	0	-	0	-	-	-	0	-	-	0	•	-	0	-				
	n3	0	-	0	-	-	-	0	-	-	0	ı	-	0	-				
SSP	_		- -	C	MMC 	AND					[SSF)	sl	ax	n1 n	2 n3	

[Area Setting]

7 11 Ou O O C C	.91		
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Position value of the main axis position synchronous main axis	-2,147,483,648 ~ 2,147,483,647	DINT
n2	Operation step number of auxiliary axis	0~30(standard), 0~80(advanced)	WORD
n3	Setting of the main axis of position synchronous	0 (axis X) or 1 (axis Y)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is executing main axis position synchronous starting for the XGB built-in positioning.
- The main axis position synchronous instruction is executed with the axis set in the axis designated as ax at the rising edge of the input condition auxiliary axis, n3 being the main axis.

- If the instruction is executed, the auxiliary axis stands by without generating actual pulse (the operation status flag of the auxiliary axis (axis X:K4200, axis Y:K4300) turns On), and n2 step of the auxiliary axis is started when n3 axis, which is the main axis, is positioned as set in n1.
- The position synchronous starting instruction can be executed only when the origins of both the
 main axis and auxiliary axis are fixed. If the origin of the main axis is not decided when the main
 axis position synchronous instruction (SSP) is started, error code 346 is issued, and if the origin of
 the auxiliary axis is not decided when the main axis position synchronous instruction (SSP) is
 started, error code 344 is issued.
- When you use the main axis position synchronous instruction, set the main axis and auxiliary axis at different axes. If they are set at the same axis, error code 347 is issued.
- If you want to cancel the main axis position synchronous instruction after you executed it, execute the stop instruction of the auxiliary axis (STP).

(b) Error

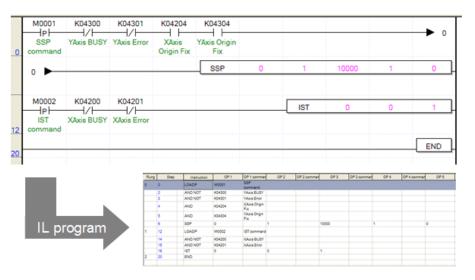
• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

• The main axis position synchronous starting instruction is described with the example of the following program.

(a) Example of the Program

• The following program example is starting No.1 step operation data of the auxiliary axis when axis Y is the auxiliary axis and axis X is the main axis, and the position of the main axis is 10,000.

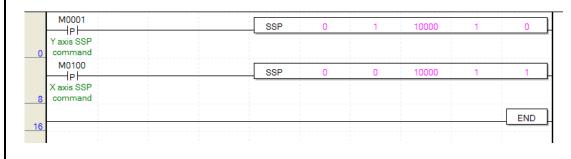


(b) Device Used

Device	Description	Data size	Example of setting
M0001	main axis position synchronous instruction signal	BIT	-
M0002	main axis instruction signal	BIT	-
K4300	Signal during auxiliary axis (axis Y) position control	BIT	-
K4301	auxiliary axis(axis Y) Error	BIT	-
K4204	axis X origin fixed	BIT	-
K4304	axis Y origin fixed	BIT	-
K4200	Signal during the main axis(axis X) position control	BIT	-
K4201	main axis(axis X) Error	BIT	-

(c) Operation of the Program

- The SSP instruction is executed if there is the rising edge of M0001, which was used as the main axis position synchronous instruction signal.
 - Since the second operand is 1 (axis Y), axis Y is the auxiliary axis, and as the fifth operand is 0(axis X), so the main axis is axis X.
- No.1 step of axis X is indirectly started if there is the rising edge of M0002, which is the indirect starting instruction signal of the main axis.
- When the current position of the main axis during operation becomes 10,000[Pulse], set in the third operand of the SSP instruction, axis Y, which is the auxiliary axis, starts No. 1 step, which is the operation step set in the fourth operand of the SSP instruction.
- · When you use the main axis position synchronous instruction, if the axis set as the main axis has already been started as the main axis position synchronous auxiliary axis, error code 349 is issued and it is not executed. If the following example, axis Y becomes the auxiliary axis and axis X becomes the main axis at the rising edge of M0001 and the main axis position synchronous instruction is executed. If there is the rising edge of M0100, the position synchronous instruction is issued with axis X being the auxiliary axis and axis Y being the main axis. In this case, since axis Y used as the main axis, is already being started as the auxiliary axis of the main axis position synchronous instruction, axis X generates error code 349 and is not started.



5.2.11 Speed Synchronous Instruction

• The speed synchronous instruction (SSS instruction) is for speed synchronization at the set synchronous speed rate and operation when the main axis is started with the axis set in the instruction being the auxiliary axis. For details, refer to 3.1.8.

(1) Speed Synchronous Starting Instruction (SSS)

			Areas available														Flag		
Instruc	ction	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-				
	ax	0	-	0	-	-	-	0	-	-	0	-	-	0	-				-
SSS	n1	0	ı	0	-	-	-	0	-	-	0	•	-	0	-	4~7	0	-	
	n2	0	•	0	-	-	ı	0	-	-	0	ı	-	0	-				
	n3	0	ì	0	-	-	1	0	-	-	0	ı	-	0	-				
SSS SI ax n1 n2 n3																			

[Area Setting]

	<u> </u>		
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	speed synchronous ratio	1 ~ 10,000(0.01% ~ 100.00%)	WORD
n2	Delay time	1 ~ 10[ms]	WORD
n3	Speed delay main axis setting	See 0 ~ 9 '(1) Function'	WORD

[Flag Set]

Ī	Flag	Description	Device number
	Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is for executing the speed synchronous starting for synchronous starting.
- The axis set in the axis designated as ax at the rising edge of the input condition auxiliary axis, n3 becomes the main axis and the speed main axis position synchronous starting instruction is executed.
- If the instruction is executed, the auxiliary axis stands by without generating actual pulse (the operation status flag of the auxiliary axis (axis X:K4200, axis Y:K4300) turns On), and nn3 axis, which is the main axis, it is started according to the speed synchronous ratio set in n1.
- The synchronous ratio settable in n1 is $0.01\% \sim 100.00\%$ (set value $1 \sim 10,000$). If the set speed ratio gets out of this range, error code 356 is issued.
- The delay time of n2 refers to the delay time it takes for speed of the auxiliary axis to reach the current main axis speed. In XGB built-in positioning, when controlling the speed synchronization, the speed of the current main axis is detected every 500 μ s, and thereby the speed of the auxiliary axis is adjusted. If the speed of the auxiliary axis is synchronized to the current main axis speed without a delay time and immediately changed, there might be damage or shock noise to the motor due to the sudden change of the auxiliary axis speed.

For example, assuming the speed ratio is 100.00% and the delay time is 5[ms], if the speed of the main axis is 10,000[pps], the XGB built-in positioning adjusts the speed of the auxiliary axis according to the speed of the main axis every $500[\mu s]$ by adjusting the current speed for the speed of the auxiliary axis to reach 10,000[pps].

The longer the delay time, the longer the delay time between the main axis and auxiliary axis, but the output pulse is stably output. If there is likely to be step out of the motor, lengthen the delay time.

- The delay time settable for n2 is 1 ~ 10[ms]. If it gets out of the settable range, error code 357 is issued.
- The main axis of n3 is settable between 0 and 9. If it gets out of the settable range, error code 355 is issued

Set value	Main axis setting	Remark
0	axis X	
1	axis Y	
2	High speed counter Ch0	
3	High speed countCh1	
4	High speed countCh2	
5	High speed countCh3	
6	High speed counter Ch4	
7	High speed counter Ch5	Only the advanced type is
8	High speed counter Ch6	settable.
9	High speed counter Ch7	

- If you want to cancel the speed synchronous instruction after you execute it, execute the stop instruction (STP) for the auxiliary axis.
- The speed synchronous control is executable even when the origin is not fixed.
- The speed synchronous control is synchronized to the speed of the main axis for operation of the auxiliary axis, so even if the control method of the auxiliary axis is set as position control, starting and stop are alternated by the operation of the main axis, with the rotation of the auxiliary axis being in the same direction as the main axis.
- If the M code of the auxiliary axis is On when you execute the speed synchronous instruction, error code 353 is issued.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

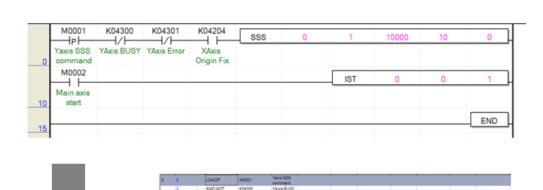
(2) Example of Use of the Instruction

• The speed synchronous starting instruction is described with the example of the following program.

(a) Example of the Program

IL program

• The following program example is about speed synchronous starting with the synchronization ratio 100.00[%] and the delay time being 10[ms] when the main axis is started if axis Y is the auxiliary axis and axis X is the main axis.



Chapter 5 Positioning Instructions

(b) Operation of the Program

- SSS instruction is executed if there is the rising edge of M0001, which was used as the speed synchronous instruction signal. Since the second operand is 1(axis Y), axis Y becomes the auxiliary axis, and because the fifth operand is 0(axis X), the main axis is axis X.
- If there is the rising edge of M0002, which is the indirect starting instruction signal of the main axis, No. 1 step of axis X is indirectly started.
- When the main axis is started, axis Y is started at the synchronous ratio speed of 100.00[%] set in the third operand of SSS instruction, and is synchronized to the main axis with the delay time of 10[ms] set in the fourth operand for operation.

5.2.12 Position Override Instruction

• The position override instruction (POR) is for changing the target position of the axis being operated for the current positioning into the target position set in the instruction. For details, refer to 3.1.10.

(1) position override instruction (POR)

			Areas available														Flag		
Instruction		PMK	F	L	Τ	O	S	Z	D.x	R.x	con stan t	J	Z	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-			-	
POR	ах	0	-	0	-	-	-	0	-	-	0	-	-	0	-	4~7	0		-
	n1	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
POR	}		_		_	(COM —	MAN	ID					<u>—</u> [Р	OR	sl	ax n1	

[Area Setting]

Operand	Description	Settable range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Target position to change	-2,147,483,648 ~ 2,147,483,647	DINT

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is giving the position override instruction to the XGB built-in positioning.
- This is changing the target position to the position set in n1 during the operation of the axis designated as ax at the rising edge of the input condition.
- The position override instruction is available in the acceleration and deceleration sections and if the position override is executed during dwell, error code 362 is issued.

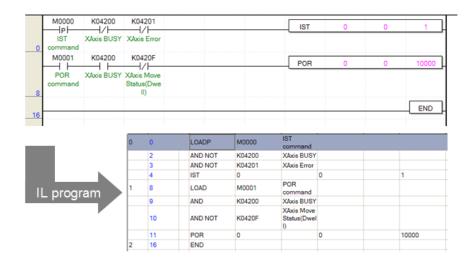
(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

- The position override instruction is described with the example of the following program.
- (a) Example of the Program

Chapter 5 Positioning Instructions



(b) Operation of the Program

- The positioning axis X is indirectly started with operation step 1 when there is the rising edge of M0000 used as the indirect starting instruction signal.
- If there is the rising edge of M0001 used as the instruction signal of the position override instruction before the current position during operation reaches 100,000 [Pulse], operation continues by changing the target position of the currently operating step into 100,000. (Note that the value of the target position of No. 1 step set in the positioning parameter is not changed)
- If the position override instruction is executed when the current position has passed 100,000[Pulse], it is decelerated and stops.
- If the position override instruction is executed during dwell operation, error code 362 is issued. To prevent this, make the program by connecting the axis X dwell flag to the starting contact point with the normally closed contact point (contact point B).

5.2.13 Speed Override Instruction

• The speed override instruction (SOR) is for changing the operation speed of the axis during current positioning operation into the speed set in the instruction. For details, refer to 3.1.10.

(1) Speed Override Instruction (SOR)

			Areas available														Flag		
Instruc	tion	PMK	F	L	۲	С	Ø	Z	D.x	R.x	con stan t	כ	Z	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	1	-	-	-			-	-
SOR	ах	0	-	0	-	-	-	0	-	-	0	-	-	0	-	4~7	0		
	n1	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
SOR COMMAND						S	OR	sl	ax n1	\rightarrow									

[Area Setting]

	31		
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Operation speed to change	0 ~ 100,000[pps]	DWORD

[Flag Set]

•			
	Flag	Description	Device number
	Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is giving the speed override instruction to XGB built-in positioning.
- This is for changing the operation speed into the speed set in n1 during the operation of the axis designated as ax at the rising edge of the input condition.
- The speed override instructions available in the acceleration and constant speed sections and if the speed override is executed during deceleration or dwell, error code 377 is issued and the currently operating operation step continues.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

• The speed override instruction is described with the example of the following program.

M0000 K04201 IST -IPH **⊣**/⊢ **⊣**/⊢ IST XAxis BUSY XAxis Error M0001 K04200 K0420F K0420E SOR HPH **-1/**F XAxis BUSY XAxis Move XAxis Move Status(Dwe Status(Dec SOR command II) eleration) END 18 IST 0 n LOADP M0000 AND NOT K04200 XAxis BUSY AND NOT K04201 XAxis Error IL program SOR LOADP M0001 10 AND K04200 XAxis BUSY XAxis Move 11 AND NOT K0420F Status(Dwel XAxis Move 12 AND NOT K0420E Status(Dece leration) 13

(a) Example of the Program

(b) Operation of the Program

• The positioning axis X is indirectly started with operation step 1 if there is the rising edge of M0000 used as the indirect starting instruction signal.

10000

SOR

END

18

- If there is the rising edge of M0001 used as the instruction signal of the speed override instruction during operation, operation continues by changing the speed of the currently operating step into 10,000[pps]. (Note that the value of the operation speed of No. 1 step set in the positioning parameter is not changed)
- If the speed override instruction is executed during deceleration or dwell, error code 377 is issued. To prevent this, make the program by connecting the axis X dwell flag to the starting contact point with the normally closed contact point (contact point B).

5.2.14 Positioning Speed Override Instruction

- The positioning speed override instruction (PSO) is changing the operation speed of the axis during current positioning operation at the specific position set in the instruction. For details, refer to 3.1.10.
- (1) Positioning speed override instruction (PSO)

							Area	as a\	/ailab	le							Flag		
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-			-	-
PSO	ax	0	ı	0	-	-	-	0	-	-	0	-	-	0	-	4~7	0		
P30	n1	0	•	0	-	-	-	0	-	-	0	-	-	0	•	4~1			
	n2	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
PSO COMMAND PSO								Э	sl	ax r	n1 n2]—							

[Area Setting]

•			
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Position to change the speed	-2,147,483,648 ~ 2,147,483,647	DINT
n2	Operation speed to change	0 ~ 100,000[pps]	DWORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

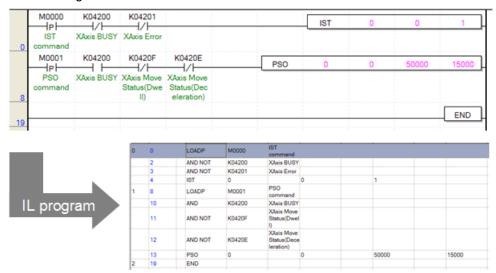
(a) Function

- This instruction is giving the positioning speed override instruction to XGB built-in positioning.
- The positioning speed override is executed at the axis designated as ax at the rising edge of the input condition, and if the current position reaches the position set in n1 during operation, the current operation speed is overridden to the speed set in n2.
- The positioning speed override instruction is available in the deceleration and acceleration sections and if the positioning speed override is executed during deceleration or dwell, no error code is issued, but the instruction is not executed either.

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

(a) Example of the Program



(b) Operation of the Program

- If there is the rising edge of M0000 used as the indirect starting instruction signal, positioning axis X is indirectly started with operation step 1.
- If there is the rising edge of M0001 used as the instruction signal of the positioning speed override instruction during operation, operation continues by changing the operation speed to 15,000[pps] when the position of the currently operating step reaches 50,000.

5.2.15 Inching Starting Instruction

• The inching starting instruction (INCH) is moving to the position set in the instruction at the inching speed set in the origin/manual parameter. For details, refer to 3.1.12.

(1) inching starting instruction (INCH)

							Area	as av	⁄ailab	le							Flag		
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	_	-	0	-	-	-	-				
INCH	ax	0	-	0	-	-	-	0	-	-	0	-	-	0	-	4~7	0	-	-
	n1	0	-	0	-	1	-	0	-	-	0	-	-	0	•				
INCH	INCH COMMAND							IN	СН	sl	ax n1								

[Area Setting]

	<u> </u>		
Operand	Description	Setting range 줄	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Position to move by inching	-2,147,483,648 ~ 2,147,483,647	DINT

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

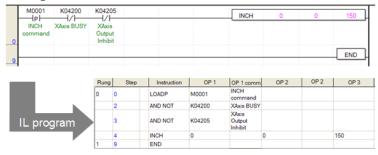
- This instruction is giving the inching operation instruction to XGB built-in positioning.
- It moves to the position set in n1 at the inching speed set in the positioning parameter with respect to the axis designated as ax at the rising edge of the input condition.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

(a) Example of the Program



- (b) Operation of the Program
- I there is the rising edge of M0001 used as the inching starting instruction signal, positioning axis X moves to position 150 at the inching speed set in the positioning origin/manual parameter.
- If the axis is in operation or inhibited from output during inching starting, it generates error code 401 and 402 respectively and no operation takes place.

5.2.16 Starting Step Number Change Instruction

• The starting step number change instruction is for changing the number of the step to be operated currently by force.

(1) Starting Step Number Change Instruction (SNS)

			Areas available														Flag		
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-				
SNS	ax	0	ı	0	ı	ı	ı	0	-	-	0	-	ı	0	•	4~7	0	o -	-
	n1	0	ı	0	ı	ı	ı	0	-	-	0	-	1	0					
		COMMAND																	
SNS											S	NS	sl	ax n1					

[Area Setting]

[Alca Octili	'8.1		
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Step number to change	1~30(standard), 1~80(advanced)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

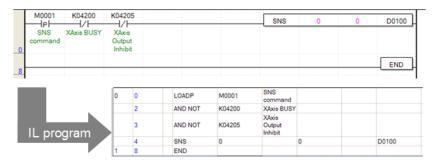
- This instruction is giving the starting step instruction to XGB built-in positioning.
- The current step number of the axis designated as ax at the rising edge of the input condition changes into the step set in n1.
- If the corresponding axis is operating when the starting step change instruction is executed, error code 441 is issue and the instruction is not executed. If the set value of n1 gets out of the settable range, error code 442 is issued and the instruction is not executed either.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

(a) Example of the Program



(b) Operation of the Program

• If there is the rising edge of M0001 used as the starting step change instruction signal, the current operation step number of positioning axis X changes into the step number set in D0100.

5.2.17 M Code Cancel Instruction

• M code cancel instruction (MOF) is for cancelling the M code generated during operation. For details, refer to 3.3.

(1) M code cancel instruction (MOF)

			Areas available														Flag		
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
MOE	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-	4~7	_		
MOF	ax	0	•	0	•	•	•	0	-	-	0	-	-	0	•	4~7	0	•	-
MOF COMMAND MOF								F :	sl ax										

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to cancel M code	0 (axis X) or 1 (axis Y)	WORD

[Flag Set]

Ī	Flag	Description	Device number
	Error	If the value of ax gets out of the range	F110

(a) Function

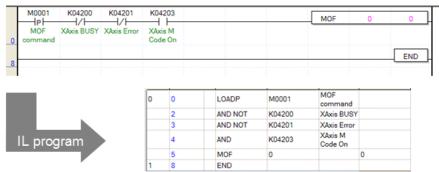
- This instruction is giving the instruction of cancelling the M code to XGB built-in positioning.
- The M code On signal (axis X: K4203, axis Y: K4303 bit) of the axis designated as ax at the rising edge of the input condition and M code number (axis X: K428, axis Y:K438 word) are simultaneously cancelled.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

(a) Example of the Program



(b) Operation of the Program

• If there is the rising edge of M0001 used as the M code cancel instruction signal and if there is an M code in positioning axis X, the M code On signal and M code number are cancelled.

5.2.18 Current Position Preset Instruction

- The current position preset instruction (PRS instruction) is for changing the current position by force.
- (1) Current Position Preset Instruction (PRS)

							Area	as av	ailab	le							Flag			
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x		con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)	
	sl	-	•	-	-	-	-	1	-	-	0	-	-	-	-			-	-	
PRS	ax	0	ı	0	ı	-	ı	0	-	-	0	-	ı	0	1	4~7	0			
	n1	0	ı	0	ı	-	ı	0	-	-	0	-	1	0	ı					
			COMMAND]					
PRS			_	1	_		\dashv	-							Р	RS	sl	ax n1		

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Current position value to change	-2,147,483,648 ~ 2,147,483,647	DINT

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

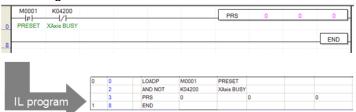
- This instruction is giving the instruction of changing the current position to XGB built-in positioning.
- The current position of the axis designated as ax at the rising edge of the input condition is changed to the position set in n1 of the instruction by force.
- If the origin is not fixed, the origin fixed status (axis X:K4202, axis Y:K4304) turns On and the origin is fixed.
- If the current position preset instruction is executed, and if the axis is currently operating, error code 451 is issued and the instruction is not executed.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

(a) Example of the Program



(b) Operation of the Program

• If there is the rising edge of M0001 used as the current position preset, the current position of the positioning axis X changes into 0, which has been set in the instruction, and the origin determining bit turns On.

5.2.19 Emergency Stop Instruction

• The emergency stop instruction is immediately stopping the current positioning operation and the output. For details, refer to 3.1.11.

(1) Emergency Stop Instruction (EMG)

			Areas available														Flag		
Instruc	tion	PMK	F	L	Т	С	S	Z	D.x	R.x	con stan t	U	N	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
EMC	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-	4 7	_		-
EMG	ax	0	-	0	-	-	-	0	-	-	0	-	-	0	-	4~7	0	-	
EMG			_	∳	-	С	OMN —	MAN()							EM	G :	sl ax]

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD

[Flag Set]

	Flag	Description	Device number
Ī	Error	If the value of ax gets out of the range	F110

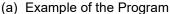
(a) Function

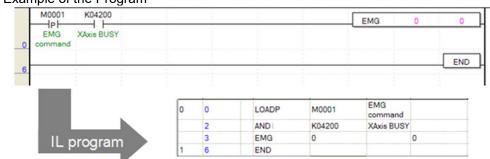
- This is for giving the emergency stop instruction to XGB built-in positioning.
- With respect to the positioning of the axis designated as ax at the rising edge of the input condition, the output immediately stops, the output stop status flag (axis X: K4205, axis Y:K4305) turns On, and error code 481 is issued.
- If the emergency stop instruction is executed, output is inhibited and the origin gets undecided, so in order to resume operation, set the origin return or floating origin or preset the current position to decide the origin.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction





- (b) Operation of the Program
- If there is the rising edge of M0001 used as the emergency stop instruction signal, the positioning axis X immediately stops the current operation, issues error code 481 and inhibits output.

5.2.20 Error Reset, Output Inhibition, Inhibition Termination

• The error reset instruction is resetting the current error and terminating the output inhibition.

(1) Error Reset Instruction (CLR)

			Areas available														Flag		
Instruc	tion	РМК	F	L	Т	С	s	Z	D.x	R.x	Cons tant	U	Ν	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	ı	-	-	-	-	-	-	-	0	•	-	-	-			-	
CLR	ax	0	•	0	-	-	-	0	-	-	0	·	-	0	ı	4~7	0		-
	n1	0	-	0	-	-	-	0	-	-	0	-	-	0	•				
CLR	?		_			(COM —	MAN	ID					_[С	LR	sl	ax n1	\mathbb{H}

[Area Setting]

	51		
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Whether output inhibition is terminated	0 ~ 65,535	WORD

[Flag Set]

Ī	Flag	Description	Device number
	Error	If the value of ax gets out of the range	F110

(a) Function

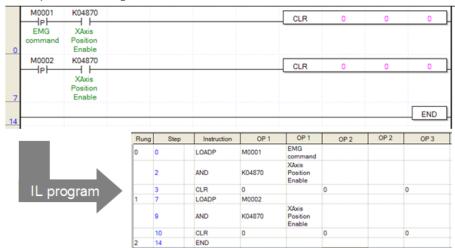
- This instruction is giving the error reset instruction to XGB built-in positioning.
- At the rising edge of the input condition, the error code generated in the axis designated as ax is cancelled, and if the value set in n1 is 0, only the error code is cancelled, with the output inhibition maintained. If the value set in n1 is other than 0, the output inhibition is also cancelled.

(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

(a) Example of the Program



(b) Operation of the Program

- · If the error and output inhibition are simultaneously generated due to the emergency stop, when there is the rising edge of M0001 used as the error cancel instruction signal, only the error code of axis X is cancelled but the output inhibition is not cancelled.
- If there is the rising edge of M0002 used as the error termination/output inhibition termination instruction signal, the error code of axis X and output inhibition are cancelled together.

5.2.21 Parameter/Operation Data Save

• The parameter save instruction (WRT) is permanently preserving the operation data of positioning area K changed during operation in the XGB built-in flash memory. For the relations between positioning area K and the positioning parameter, refer to 3.2.2.

(1) Parameter Save (WRT)

		Areas available									Flag								
Instruction		PMK	F	L	Т	C	S	Z	D.x	R.x	cons tant	U	Ν	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	ı	-	ı	ı	-	-	-	-	0	ı	-	-	ı				
WRT	ax	0	-	0	-	-	-	0	_	-	0	1	-	0	•	4~7	0	-	-
	n1	0	-	0	-	-	-	0	-	-	0	ı	-	0	1				
WRT _					_	(COM	MAN	D					_	V	/RT	sl	ax n1	

[Area Setting]

	01		
Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Not used in XGB	0 ~ 1(Dummy Operand)	WORD
n1	Set the parameter to save	0~2	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- The instruction is for permanently preserving the operation data of positioning area K in the XGB built-in flash memory.
- The operation data of positioning area K are permanently preserved in the XGB built-in flash memory according to the setting of n1 at the rising edge as follows.

Set value	0	1	2
Area k to be permanently preserved	Positioning data	High speed counter data	PID control function data

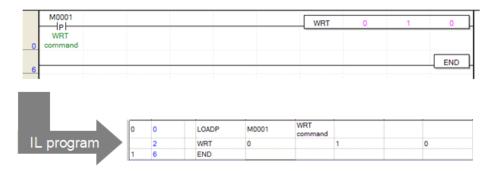
- If n1 has been set at 0, the current operation data of area K of axis X and axis Y for positioning are permanently preserved as the positioning parameter. If set at 1, the data of area K of all the channels of the high speed counter are permanently preserved as the positioning parameter. If set at 2, the data set in area K of 16 loop of the built-in PID are permanently preserved as the PID parameter.
- Although the value set as ax is the operand that does not affect the execution of WRT instruction, if it gets out of the setting range, instruction execution error flag (F110) turns On and the instruction is not executed.

(b) Error

 If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

(2) Example of Use of the Instruction

(a) Example of the Program



(b) Operation of the Program

• If there is the rising edge of M0001 used as the parameter save instruction signal, the operation data of area K of positioning axis X and axis Y are permanently preserved as the positioning parameter of XGB built-in flash memory.

- If WRT instruction is executed, the previously saved positioning parameter is deleted and the parameter is changed to the operation data of the current area K.
- Be careful that if WRT instruction is executed, the scan time of the scan where the instruction has been executed because the previous positioning parameter of the flash memory is deleted and the operation data of area K is written.

5.2.22 Pulse Width Modulation

• Pulse Width Modulation is to operate On/Off output in designated Off duty rate and Output cycle.

(1) Pulse width Modulation (PWM)

		Areas available											Flag						
Instruc	tion	PMK	F	L	Т	O	S	Z	D.x	R.x	cons tant	J	Z	D	R	Step	Error (F110)	Zero (F111)	Carry (F112)
	sl	-	-	-	-	-	-	-	-	-	0	-	-	-	-				
WRT	ax	0	-	0	_	-	_	0	-	-	0	-	-	0	-	4~7	0	-	-
VVIXI	n1	0	-	0	-	-	-	0	-	-	0	-	-	0	-				
	n2	0		0				0			0			0					
PWM			٦	l		(COMI	MAN 	D				_	PWM	l	sl	ax I	n1 n2	

[Area Setting]

Operand	Description	Setting range	Data size
sl	Slot No. of positioning module	XGB is fixed at 0	WORD
ax	Axis to give instruction	0 (axis X) or 1 (axis Y)	WORD
n1	Output Cycle	1~20,000(ms)	WORD
n2	Off duty rate	0~100(%)	WORD

[Flag Set]

Flag	Description	Device number
Error	If the value of ax gets out of the range	F110

(a) Function

- This instruction is for PWM output.
- While the input condition is On state, XGB postioning outputs pulse train in designated cycle time in n1 and designated Off duty rate in n2 at designated axis in ax
- During PWM output, current address don't change. Constant speed bit(X axis: K0420D, Y axis: K0430S) and Operation bit(X axis: K04200 Y axis: K4300) set On.

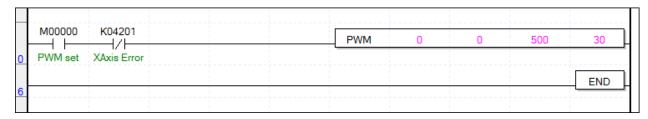
(b) Error

• If the value designated as ax (instruction axis) is other than 0 and 1, the error flag (F110) is set and the instruction is not executed.

- If PWM instruction is executed, other instruction do not operate. And upper/lower limit does not
- If PWM instruction is executed, STP, EMG instruction doesn't operate. To stop output, Off the Start-up contact
- If output cycle is changed, when operating APM PWM, it cannot be applied.
- PWM applicable version
- -XBM-DNxxS: H/W from V2.0, O/S V3.10
- -XBC-DN/DPxxH: O/S from V2.03
- -XBC-DN/DPxxSU: O/S from V1.10

(2) Example of Use of the Instruction

(a) Example of the Program

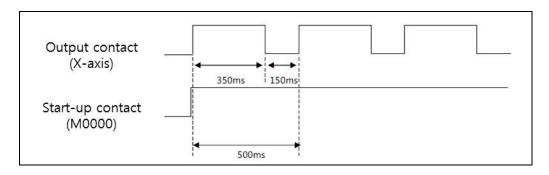


(b) Used Device

Device	설 명
M00000	PWM output reference signal
K04201	X-axis error state

(c) Operation of the Program

- While M00000 is On which is used as output reference signal, PWM is operated. (At this time, the X-axis is in operation or errorstatus, the instruction will not be executed.)
- If PWM executed, designated output cycle(500ms for this picture) and designated Off duty rate(30% for this picture)



5.3 Positioning Function Blocks (In case of XEC)

5.3.1 General for Function Block

In the XEC PLC, the input/output variables and their functions which are applied commonly for all the function blocks used for internal positioning are as follows..

Classification	Variable Name	Data Type	Description				
			•Request for function block execution				
			- If the condition in connection with this area is				
	REQ	BOOL	satisfied during the software running and 0→1				
			(edge or level), the function block is executed.				
Input Variables	BASE	USINT	Base Number This area is for setting up the number of the base where the positioning module is mounted. (In the internal positioning of XGB, fix this to 0.)				
			•Slot Number				
	01.07	LIGINIT	- This area is for setting up the number of the slot				
	SLOT	USINT	where the positioning module is mounted. (In the				
			internal positioning of XGB, fix this to 0.)				
	AXIS	USINT	•Number of the axis in use - X-axis: 0, Y-axis: 1				
			•Indicates completion of the function block execution				
	DONE	D001	- If the function block is executed without error,				
	DONE	BOOL	"1" is outputted and maintained until the next				
			execution. If erroneous, "0" is outputted.				
Output			•Error State Indication				
Variables			- This area indicates the number of the error				
	OTAT	LUNIT	occurred in the start-up of the function block.				
	STAT	UINT	(The errors occurred during operation are				
			indicated in the K area which outputs error				
			codes.)				

Other I/O variables excluding the common variables presented in the above table are described below.

(1) Common Error Codes for Function Block

The types and description of the common error codes which may occur in the starting up of the function blocks related with internal positioning are as follows.

Error Code	Error Type	Countermeasures
0	Function block normally executed	-
1	Base No. exceeded setting range	Set the base No. to "0" for internal positioning.
3	Slot No. exceeded setting range	Set the slot No. to "0" for internal positioning.
6	Axis range No. exceeded setting range	Adjust the axis No. within the allowable range of the function block (0: X-axis, 1: Y-axis)
10	A new function block was executed while the previous instruction has not been completed	Modify the program so that a new function block can be executed after completion of the previous instruction.
11	Set-up auxiliary input value exceeded allowable range	Adjust the value within the allowable range.

For other error code, see "Appendix 1. Error Code List."

5.3.2 Function Block for Return to Origin

•Return to Origin instruction is usually used to confirm the Origin of machine when applying power. This instruction is executed in accordance with the set-up parameters shown below (see 3.2.4 for setting-up of the return-to-Origin parameters).

(1) Return to Origin Function Block (APM_ORG)

Form	Description
- REQ DONEBASE STATSLOT -AXIS	 This instruction is for the execution of the Origin return of the XEC-DN**H internal positioning function. At the ascending edge of the input condition, the return to Origin instruction is given to the axis defined to be the axis of the internal positioning decision. After completing Origin return, the Origin determination bit (X-axis: %KX6724,Y-axis: %KX6884) turns on and the present address is preset to the address setup with the Origin return parameter.

(2) Related Device List

•The parameters related with the APM_ORG instruction and the exclusive K area devices are presented in the table below.

Pa	rameter	Exc	lusive K Ar	ea	Doto Type
Title	Setting Range	X-axis	Y-axis	Attribute	Data Type
Origin returning	0: DOG/ Origin (Off)	%KX7648	%KX8288	Read/Writ	Bool
method	1: DOG/ Origin (On) 2: DOG	%KX7649	%KX8289	е	Bool
Origin returning direction	0: normal, 1: reverse	%KX7650	%KX8290	Read/Writ e	Bool
Origin address	-2,147,483,648 ~ 2,147,483,647[pulse]	%KD234	%KD254	Read/Writ e	DINT
Origin return high speed	1 ~ 100,000[pps]	%KD235	%KD255	Read/Writ e	UDINT
Origin return low speed	1 ~ 100,000[pps]	%KD236	%KD256	Read/Writ e	UDINT
Origin return accelerating time	0 ~ 10,000[ms]	%KW475	%KW515	Read/Writ e	UINT
Origin return decelerating time	0 ~ 10,000[ms]	%KW476	%KW516	Read/Writ e	UINT
Dwell time	0 ~ 50,000[ms]	%KW477	%KW517	Read/Writ e	UINT

(4) Exemplary Instruction

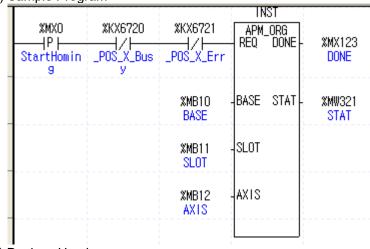
- •An example of return to Origin instruction execution is explained with the exemplary parameters and sample program as presented below.
- •The example of the APM_ORG instruction is with reference to the X-axis.

(a) Parameter Setting

(a) Farameter Setting							
Parameter							
Title	Value						
Origin returning method	1:DOG/HOME (On)						
Origin returning direction	1: reverse						
Origin address	0						
Origin return at high speed	50,000 [pps]						
Origin return at low speed	500 [pps]						
Origin return accelerating time	100[ms]						
Origin return decelerating time	100[ms]						
Dwell time	100[ms]						

	Home Method	1: DOG/HOME(ON)
••••	Home Direction	1: CCW
••••	Home Address	0 pls
••••	Home High Speed	50000 pls/s
••••	Home Low Speed	500 pls/s
	Homing ACC Time	100 ms
Home """ Parameter """	Homing DEC Time	100 ms
r arameter	DWELL Time	100 ms

(b) Sample Program



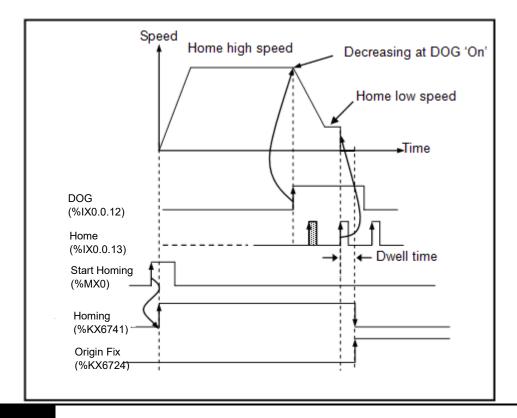
(c) Devices Used

Device	Description
StartHoming	Signal for X-axis Origin return start-up
%KX6720	Signal for X-axis in operation
%KX6721	X-axis in error status

(d) Program Operation

At the ascending edge of the 'starting-up Origin return' used for the Origin return start-up signal for X-axis, the APM_ORG instruction is executed. At this time, the X-axis is in operation or error status, the instruction will not be executed.

- 1) When the Origin return instruction (APM_ORG) is executed, the operation will be 'Origin return at high speed (50,000 pps)' accelerated reversely as set up in the Origin return parameter.
- 2) If an ascending edge of DOG signal occurs during the operation of Origin return at high speed, it will be decelerated and operated at the Origin return at low speed (500 pps) set up in the parameter. The decelerating time will be 100 ms set up in the parameter.
- 3) If the Origin signal which is an external signal enters after being changed to Origin return at low speed, the output is immediately stopped, and the Origin determination status flag (%KX6724) is turned on after the dwell time (100ms) set up in the parameter. From the interruption of the output to the turning On of the Origin determination status flag (%KX6724), there may be (dwell time + 1 scan time) of delay.
- 4) Here, the present address will be preset to '0' which is the address of the Origin set up in the parameter.



•The DOG signal and Origin signal are fixed to the contact points shown below.

	XEC-DNxxH					
	DOG	Origin point				
X-axis	%IX0.0.12	%IX0.0.13				
Y-axis	%IX0.0.14	%IX0.0.15				

- •Take care that, if both the DOG and Origin input contact are used as the external preset inputs of the high speed counter or as the start up signals for the external contact, the Origin detection may become incorrect.
- •During returning to Origin, the present position address is not changed.

5.3.3 Function Block for Floating Origin Setting

- •In floating Origin setting, the present position is set up as the Origin by instruction, without executing mechanical operation of Origin return.
- (1) Floating Origin setting instruction (APM_FLT)

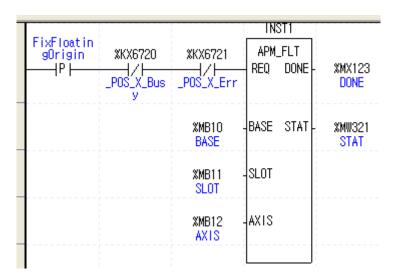
Form D	Description
INST1 APM_FLT REQ DONE BASE STAT	•This is the instruction for floating Origin setting in the XGB internal positioning. •At the ascending edge of the input condition, floating Origin instruction is given to the axis selected as the axis for the XGB positioning. •When this instruction is executed, the present position address becomes 0 and the Origin determination bit (X-axis: %KX6724,Y-axis: %KX6884) becomes On.

- •For floating Origin setting, the present position is preset to 0 and only Origin is determined. Therefore, following cautions should be taken for this instruction.
 - → Before executing this instruction, check it an error has been occurred. If occurred, correct the cause of the error and reset the error with APM_RST instruction to lift the output interruption.
 - → Then, set up the floating Origin and change the step No. for operation to the start-up step change instruction (APM_SNS) and start-up.

(2) Example of Instruction

- •The floating Origin setting instruction is explained with a sample program shown below.
- •This exemplary APM_FLT instruction is with reference to the X-axis.

(a) Sample Program



(b) Used Devices

Device	Description			
Floating Origin	X-axis floating reference instruction			
Instruction	signal			
%KX6720	X-axis in-operation signal			
%KX6721	X-axis error state			

(c) Program Operation

- •When the rising edge of the 'floating reference instruction' which was used as the X-axis floating reference instruction signal is generated, the APM FLT instruction is executed. (However, the instruction is not executed if the X-axis is in operation or error.)
 - •When the APM_FLT instruction is executed, the Origins is determined at the present position different from return to reference, and the Origin determination signal (X-axis: %KX6724) turns on and the present address is preset to 0.

5.3.4 Direct Start-up Function Block

•In direct start-up, the operation data such as target position or velocity is specified in the exclusive positioning instruction (APM_DST instruction), not using the setting for operation steps set up in the positioning operation data.

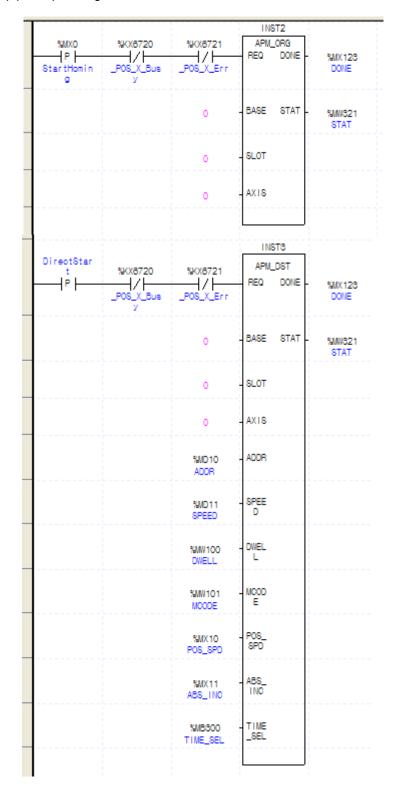
(1) Direct Start-up Instruction (APM_DST)

Form	Variable	Data Type	Description
APM_DST - REQ DONE -	ADDR	DINT	Target address (position) • Setting range: -2,147,483,648 ~ 2,147,483,647
-BASE STAT- -SLOT	SPEED	UDINT	Operation velocity • Setting range: 0 ~ 100,000
-ADDR	DWELL	DINT	Dwell time ■ Setting range: 0 ~ 50,000
-SPEE D	MCODE	UINT	M Code No. ■ Setting range: 0 ~ 65,635
-DWEL L -MCOD	POS_SPD	BOOL	Position/velocity control selection • Setting range: 0 ~ 1(0: position, 1: velocity)
-POS_ SPD	ABS_INC	BOOL	Absolute/Incremental coordinates selection • Setting range: 0 ~ 1(0: absolute, 1: Incremental)
-ABS_ INC -TIME _SEL	TIME_SEL	USINT	Acceleration/deceleration time numbering • Setting range: 0 ~ 3 0: Accl./Dec. time 1, 1: Accl./Dec. time 2, 2: Accl./Dec. time 3, 3: Accl./Dec. time 4

(2) Sample Instruction

- •Direct start-up instruction is explained with the sample program below.
- •This exemplary APM_DST instruction is with reference to the X-axis.

(a) Sample Program



(b) Used Devices

Device	Description	Data Size	Exemplary Setting
Reference Decision	X-axis reference return instruction signal	BOOL	-
Direct Start	X-axis direct start-up instruction signal	BOOL	-
%KX6720	X-axis in-operation signal	BOOL	-
%KX6721	X-axis error state	BOOL	-
ADDR	Target position	DINT	100,000
SPEED	Target velocity	UDINT	30,000
DWELL	Dwell time	DINT	100
MCODE	M code No.	UINT	123
POS_SPD	Position/velocity control selection	BOOL	0
ABS_INC	Absolute/Incremental coordinates selection	BOOL	0
TIME_SEL	Acce/dec. time numbering	BOOL	0

(d) Program Operation

- •APM_DST instruction is executed when the rising edge of the direct start-up used as the Xaxis direct start-up instruction signal is generated. However, if X-axis is in operation or the instruction is not executed.
- •If reference has not been defined at the start of DST, error code 224 is outputted to STAT 1 and the instruction is not executed.
 - In such case, turn on the 'reference determination' signal ON and perform reference return with APM ORG instruction before starting-up the APM DST instruction.
 - 1) When the direct start-up instruction (APM DST instruction) is executed, positioning operation is started as set up in the operand as shown below.
 - Because the BASE, SLOT and AXIS are 0, the built-in positioning X-axis of the base unit is started.
 - The target position is the 100,000 pulse set up in ADDR as DINT.
 - The target velocity is 30,000 pps set up in SPEED as UDINT.
 - After the positioning, the dwell time is 100ms set up in the DWEELL, and as for M code, the 123 stored in the MCODE is stored in the %KW428.
 - Because POS SPD and ABS INC are 0, positioning control operation is based on absolute coordinates. Since TIME SEL is 0, the acceleration/deceleration pattern follows 1 which is the acceleration time in the basic parameters.
 - In particular, when the APM_DST instruction is started, positioning is controlled in absolute coordinates, operated at 30,000 pps up to 100,000 pulse position and stopped, and positioning is completed after 100ms of dwell time and the M code outputs 123.
 - 2) When the position has been determined by direct start-up, the position determination completion signal (X-axis: %KX6722) turns on for one scan.

5.3.5 Indirect Start-up Function Block

•In the indirect start-up, position determination operation is performed with the operation step data set up in the position determination operation data.

(1) Indirect Start-up Instruction (APM IST)

Form	Variable	Data Type	Description
INST APM_IST - REQ DONE - BASE STAT - -SLOT -AXIS -STEP	STEP	UINT	Operation step No. ● Setting range: 0 ~ 80

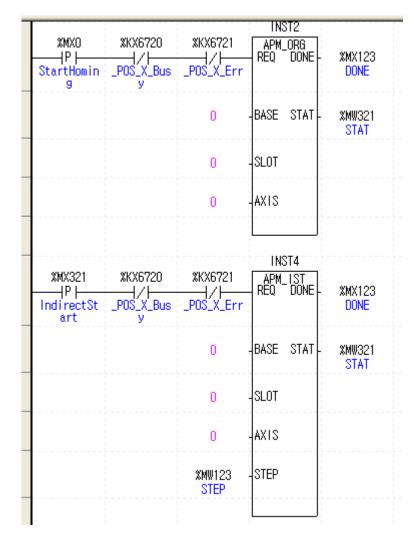
(a) Function

- •This instruction provides an indirect start-up reference to the XGB built-in positioning.
- •At the rising edge of input condition, indirect start-up is executed in the axis defined to be the axis of XGB positioning.
- •When the instruction is executed, positioning is performed using the operation data in the K area according to the step No. designated to the STEP. If the STEP is 0, the operation step indicated at the step No. (X-axis: %KW426, Y-axis: %KW436 word) in the exclusive K area is executed.
- •With indirect operation instruction, diversified composition and execution of operation patterns can be implemented, such as termination, continue, continuous, single, or repeated operation, etc.

(2) Sample Instruction

- •Indirect start-up instruction is explained with the sample program shown below.
- •The sample IST instruction is described with reference to X-axis.

(a) Sample Program



(b) Used Devices

Device	Description	Data Size	Setting Examples
Reference	X-axis reference return	BOOL	-
Determination	instruction signal		
Indirect Start	X-axis indirect start-up instruction signal	BOOL	-
%KX6720	X-axis in-operation signal	BOOL	-
%KX6721	X-axis error state	BOOL	-
STEP	Start-up step No.	UINT	3

	Step	Coordi	Op.	Contro	Op.	Rep.	Target	M	Accl/de	Op. Speed	Dwell
	No.	nate	Pattern	I Type	Type	Step	Pos. [Pulse]	Code	c. No.	[pls/s]	Time [ms]
I	3	Rel.	Term.	Pos.	Sing.	0	7,000	0	1	100	10

(c) Program Operation

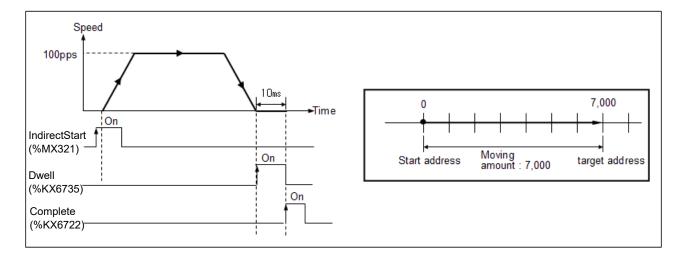
- •When the rising edge of the 'Indirect Start-up' uses as the X-axis indirect start reference signal is generated, the APM_IST instruction is executed. However, if X-axis is in operation or error state, the instruction is not executed.
- •If the Origin has not been defined at the start-up of the APM IST, error code 224 is outputted to the STAT 1 and the operation is not executed.

In such case, turn the 'Reference Decision' on to execute APM ORG instruction to return to reference before starting the APM IST instruction.

- 1) When direct start-up instruction (APM_IST instruction) is executed, positioning operation is started as set up in the instruction line operand as set forth below.
 - Since the BASE, SLOT and AXIS are 0, the built-in positioning X-axis of the base unit is started up.
 - Because the start-up step No. was appointed by 3, positioning operation is carried out with the data in the No. 3 step of the positioning operation data.

In particular, when the APM IST instruction is stated, positioning is carried out as set up in the operation data No. 3 step in Incremental coordinates, move to 7,000 pulse position at 100 pps velocity and stop, and after 10ms of dwell time, the positioning is completed.

2) Here, as the M code was set to 0, it is not generated, and as the operation pattern is terminated, the step No. X-axis: %KW426 of the exclusive K area is changed to 4 which is the (present operation step + 1).



- •In addition to using indirect start instruction, indirect start can be done using the start signal reference contact (X-axis: %KX6864, Y-axis: %KX7024) in the K area.
- → In the start-up using the start signal reference contact, the operation step is fixed to the present operation step number which is X-axis: %KW426, Yaxis: %KW436.
- → Therefore, to change operation step in starting –up using start signal reference contact, change the operation step with starting step number change instruction (APM SNS) and then turn the start reference contact ON.
- •For the details of the starting method using starting signal reference, see 3.4.2.

5.3.6 Linear Interpolation Start-up Function Block

- •In linear interpolation start-up, both X and Y axes are used in the manner that the movement paths of the 2 axes, from the start address (present stationary position) to the target address (position), is linear.
- •This method can be classified into absolute coordinates control and Incremental coordinates control. For details, see 3.1.2.
- •At the linear interpolation start-up instruction, the axis having greater movement for positioning becomes the main axis automatically. If the 2 axes move the same distance, X-axis is set up as the main axis.
- •Here, the velocity of the subsidiary axis does not follow the setting of the operation data. The operation velocity, accelerating and decelerating times, and bias velocity are calculated automatically with the formula below to perform the operation.

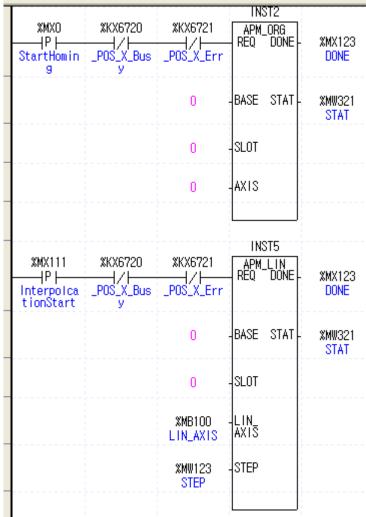
•The operation patterns available for linear interpolation are termination and continuous operation only. If the interpolation operation is started when the main axis is set up to be continuous, the XGB internal positioning does not trigger error and performs the operation of the main axis by changing it to be continuous. If the sub-axis is set to be continuous, it does not affect linear interpolation.

(1) Linear Interpolation Start-up Instruction (APM_LIN)

Form	Variable	Data Type	Description				
APM_LIN - REQ DONE - - BASE STAT -	LIN_ AXIS	USINT	● Interpolation operation axis Axis information Y-				
-SLOT -LIN_ AXIS -STEP	STEP	UINT	Operation step No. • setting range: 0 ~ 80				

(2) Sample Instruction

(a) Sample Program



(b) Used Device

Device	Description	Data Size	Example
Reference Decision	X-axis reference return instruction signal	BOOL	-
Interpolation Start	Interpolation start reference signal	BOOL	-
%KX6720	X-axis in-operation signal	BOOL	-
%KX6721	X-axis error state	BOOL	-
LIN_AXIS	Axis information	USINT	3
STEP	Operation step No.	UINT	10

Axis	Step No.	Coord inate	Op. Pattern	Contr ol Type	Op. Type	Rep. Step	Target Pos. [Pulse]	M Code	Accl/de c. No.	Op. Speed [pls/s]	Dwell Time [ms]
Х	10	Rel.	Term.	Pos.	Sing.	0	7,000	0	1	100	10
Υ	10	Rel.	Term.	Pos.	Sing.	0	2,000	0	2	300	10

Chapter 5 Positioning Instructions

(d) Program Operation

- •At the rising edge of the 'Interpolation Start-up' used as the linear interpolation start-up reference signal, the APM_LIN instruction is executed. If X-axis is in operation or error condition, it is not executed. If Y-axis is in operation, error code 242 is outputted to STAT_1 and operation is not performed.
- 1) When linear interpolation instruction (APM_LIN) is executed, linear interpolation operation is carried out as set up in the instruction operand as set forth below.
- 2) Since the BASE and SLOT are 0, the internal positioning of the base unit performs linear interpolation operation.
- 3) Since the STEP operation step No. was set to 10, main and sub-axes are automatically selected with the No. 10 operation data of the X-axis and Y-axis. In this example, since the target position of the X-axis is larger, X-axis becomes the main the Y-axis becomes the sub-axis.
- 4) Here, the velocity and the accelerating and decelerating times of the sub-axis Y do not follow the set up values but automatically calculated for operation.
- 5) in particular, with the APM_LIN instruction, the X-axis and Y-axis become main and sub-axes, respectively, and travels by (7000, 2000) in elative position basis before operation stopped.

5.3.7 Simultaneous Start-up Function Block

•Simultaneous start-up instruction (APM_SST) starts the steps of the 2 axes designated in the instruction simultaneously. For details, see 3.1.7.

(1) Simultaneous Start-up Instruction(APM SST)

Form	Variable	Data Type	Description		
APM_SET - REQ LANGE - BASE STAT - SLOT	SST_ AXIS	USINT	Simultaneous start-up operation Axis information Y-	Setting Value	Operation axis
-SST_ AXIS	X_STEP	UINT	Operation step No. • Setting range: 0 ~ 80		
-X_ST EP -V_ST EP	Y_STEP	UINT	Operation Step No. ■ Setting range: 0 ~ 80		
-Z_ST EP	Z_STEP	UINT	Dummy variable		

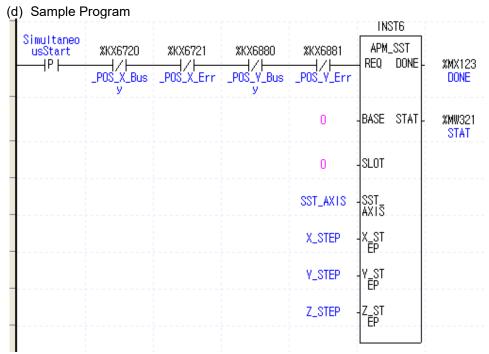
(a) Function

- •This instruction gives simultaneous start-up reference to the XGB internal positioning.
- •At the rising edge of the input condition, the 2 axes of the XGB positioning are started up simultaneously. See 3.1.7 for the difference between using simultaneous start up instruction and continuous start up of 2 axes continuously with PLC ladder programming.
- •When this instruction is executed, of the XGB's positioning axes, X and Y axes are simultaneously started up using the operation data set up at X_STEP and Y_STEP for X-axis and Y-axis, respectively. Here, since the XGB internal positioning has no Z-axis, the set value of Z_STEP does not have influence on the operation.

Chapter 5 Positioning Instructions

(2) Exemplary Instruction

•The sample program below is provided to explain the operation of the simultaneous start-up instruction.



(e) Used Devices

Device	Description	Data Size	Exemplary Setting
Simultaneous Start	Simultaneous start reference signal	BOOL	-
%KX6720	X-axis in-operation signal	BOOL	-
%KX6721	X-axis error state	BOOL	-
%KX6880	Y-axis in-operation signal	BOOL	-
%KX6881	Y-axis error state	BOOL	-
SST_AXIS	Axis setting	USINT	3
X_STEP	X-axis operation step No.	UINT	1
Y_STEP	Y-axis operation step No.	UINT	2
Z_STEP	Z-axis operation step No.	UINT	-

Axis	Step No.	Coord inate	Op. Pattern	Contr ol Type	Op. Type	Rep. Step	Target Pos. [Pulse]	M Code	Accl/de c. No.	Op. Speed [pls/s]	Dwell Time [ms]
Х	1	Coor.	Term.	Pos.	Sing.	0	7,000	0	1	100	10
Υ	2	Coor.	Term.	Pos.	Sing.	0	2,000	0	2	300	10

(f) Program Operation

- •At the occurrence of the rising edge of the simultaneous start-up used for the simultaneous start-up reference signal, the APM_SST instruction is executed.
 - 1) When the simultaneous start-up instruction (APM_SST) is executed, the 2 axes start up simultaneously as set up in the instruction operands set forth below.
- 2) Since the BASE and SLOT are 0, the internal positioning of the base unit performs simultaneous start-up.
- 3) Since the operation step numbers of the X and Y axes are set to 1 and 2 respectively, the 2 axes start up simultaneously using the operation data set up in the operation steps.
- 4) Since the XGB internal positioning has no Z-axis, the Z-axis operation step No. has no influence on the operation.

5.3.8 Velocity to Position Transfer Function Block

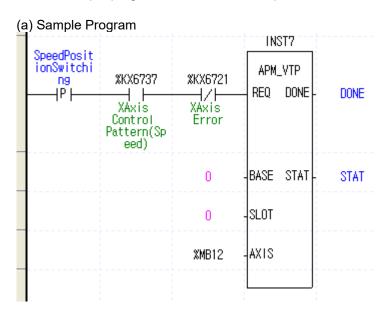
•Velocity/Position transfer instruction (APM_VTP) changes the axis presently in velocity control to position control and determines position to the target position. For details, see 3.1.4.

(1) Velocity/Position Transfer (APM_VTP)

Form	Description
INST APM_VTP - REQ DONE -BASE STAT -SLOT -AXIS	 This instruction provides XGB internal positioning with velocity/position transfer reference. At the rising edge of the input condition, the axis designated as the AXIS is transferred from velocity operation to position operation. At this time, the present position outputted from the previous velocity control operation is initialized to 0 and the system operates in absolute coordinates system to the target position.

(2) Sample Instruction

•The sample program below shows the operation of the velocity/position control transfer instruction.



(b) Used Devices

Device	Description	Data Size	Exemplary Setting
Velocity/Position Transfer	Velocity/Position Transfer reference signal	BOOL	-
%KX6737	X-axis in-velocity-control signal	BOOL	-
%KX6721	X-axis error state	BOOL	-

Chapter 5 Positioning Instructions

(c) Program Operation

- •At the occurrence of the rising edge of the velocity to position transfer used as the velocity to position transfer reference signal, the VTP instruction is executed.
- •if presently under velocity control, the mode is changed to position control and the present position is preset to 0 and position control is carried out until the target position. At this time, the target position is classified as follows according to being in the indirect or direct start-up.
 - 1) If presently in indirect start up, the target position of the step in operation becomes the target position after transfer from velocity to position control.
 - 2) If presently in direct start up, the target position value set up as the operand with the APM DST instruction becomes the target position after transfer from velocity to position control.
- •When using this velocity/position transfer instruction, as shown in the sample program above, use the indicator flag (X-axis: %KX6737, Y-axis: %KX6897) during velocity control to prevent instruction from being executed during position operation.

5.3.9 Position Velocity Transfer Function Block

•This APM_PTV instruction changes the axis presently in position control to velocity control. For details, see 3.1.5.

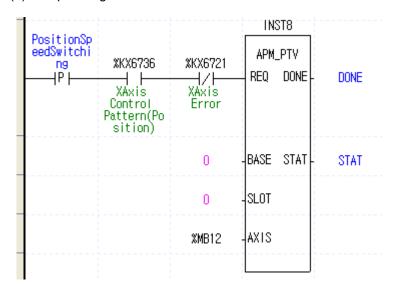
(1) Position/Velocity Transfer Instruction (APM_PTV)

Form	Description
INST1 APM_PTV - REQ DONE -BASE STAT -SLOT -AXIS	 This instruction provides position/velocity transfer reference to the XGB internal positioning. At the rising edge of the input condition, the axis designated as the AXIS is transferred from position operation to velocity operation. At this time, the present position obtained from the previous velocity control operation is not initialized to 0, and only the control mode is changed from position to velocity to continue to operate.

(2) Sample Instruction

•The sample program below shows the operation of the position/velocity control transfer instruction.

(a) Sample Program



(b) Used Devices

Device	Description		Data Size	Exemplary Setting
Position/Velocity Transfer	Position/Velocity reference signal	transfer	BIT	-
%KX6736	X-axis in-position signal	control	BIT	-
%KX6721	X-axis error state		BIT	-

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(c) Program Operation

- •At the occurrence of the rising edge of the position/velocity transfer signal used as position/velocity transfer reference signal, the PTV instruction is executed.
- •Present position control mode is changed to velocity control mode. The present position is not preset and only control mode is changed.
- •After changed to velocity control, to stop operation, used the stop instruction (APM_STP).
- •When using this position/velocity transfer instruction, as shown in the sample program above, use the position control indicator flag (X-axis: %KX6736, Y-axis: %KX6896) to prevent instruction from being executed during velocity operation.

5.3.10 Deceleration Stop Function Block

•This APM_STP instruction decelerates a running axis at the rate specified in the instruction to stop it. For the details of the stop function in positioning operation including deceleration stop, see 3.1.11.

(1) Decelerate to Stop Instruction (APM STP)

Form	Variable	Data Type	Description
APM_STP - REQ DONE - -BASE STAT - -SLOT -AXIS	DEC_TIME	UINT	Deceleration time • Setting range: 0 ~ 65,535
		[

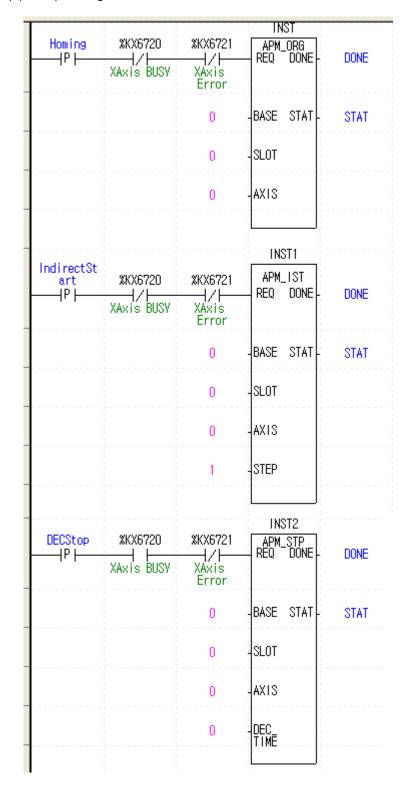
(a) Function

- •This instruction executes deceleration stop to XGB internal positioning.
- •At the rising edge of the input condition, the axis designated to be the AXIS decelerates and stops at the deceleration time set up in the respective operation step.
- •It the deceleration time setting is 0, the XGB positioning stops immediately without waiting the time for deceleration. In this case, the motor may make impact sound by shock, which requires
- •If the DEC_TIME setting is 0, the positioning stops immediately without deceleration process. For other setting values, it stops according to the acceleration/deceleration number set up in the operation data of the respective operation step or in the APM DST instruction, in case of indirect start-up or direct start-up, respectively.

(2) Sample Instruction

•The sample program below show the exemplary operation of the deceleration stop.

(a) Sample Program



(b) Used Devices

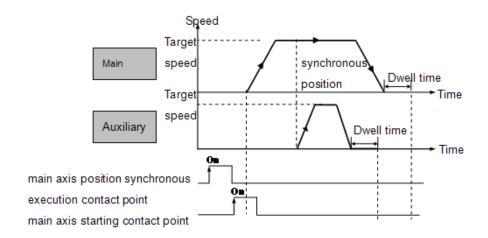
Device	Description	Data Size	Exemplary Setting
Return to Reference	Return to Home instruction signal	BIT	-
Indirect starting	Indirect start-up reference signal	BIT	-
Deceleration stop	Deceleration stop reference signal	BIT	-
%KX6720	X-axis in position control signal	BIT	-
%KX6721	X-axis error state	BIT	-

(d) Program Operation

- •At the rising edge of the 'Indirect Start-up' signal used as the indirect start-up reference signal, the Installation instruction is executed.
 - In the above program, indirect start-up for the No. 1 step of the X-axis is executed.
- •At the rising edge of the 'Deceleration Stop' signal used as the deceleration stop during operation reference signal, the deceleration stop instruction is executed in accordance with the setting of the STP instruction.
 - Since the BASE, SLOT and AXIS are set to 0, deceleration stop is executed to the X-axis of the internal positioning of the base unit.
 - At this time, since the deceleration time setting is 0, the STP instruction will result in immediate stop without deceleration time.
- For APM STP instruction execution, take care of followings;
 - When stopping by deceleration stop instruction, positioning operation is not completed until the set up target position. Therefore, position determination completed signal (X-axis: %KX6722, Yaxis: %KX6882) is not created, and if M code was set up, the M code signal is not turned on, neither.
 - In this case, the present operation step No. is maintained.
 - If indirect start-up instruction is executed again later, operation method varies by coordinate system.
 - 1) In absolute coordinate system: output the residual position output not outputted in the present operation step.
 - 2) In Incremental coordinate system: operates for the new target position value.
 - For example, if the target value of the respective step is 20,000 and was stopped at position of 15,000 by deceleration stop instruction, and if the indirect start-up instruction is executed again; in absolute coordinate system, the system travels for the rest value of 5,000 and stops at position 20,000, and; in Incremental coordinate system, the system travels 20,000 again and stops at 35,000.

5.3.11 Position Synchronization Function Block

•As shown below, this is a synchronous start-up instruction with the axis set up by the position synchronization instruction (APM_SSP) as the sub-axis according to the present position of the main axis. For details, see 3.1.8.



(1) Position Synchronization Start-up Instruction (APM SSP)

Form	Variable	Data Type	Description
INST4 - APM_SSP - REQ DONEBASE STAT -	STEP	UINT	Operation step No. ■ Setting range: 0 ~ 80
-AXIS -STEP	MST_ AXIS	USINT	Main axis ■ Setting range: 0 ~ 1(0: X-axis, 1: Y-axis)
-MST AXIS -MST ADDR	MST_ ADDR	DINT	Target position of main axis • Setting range: -2,147,483,648 ~ 2,147,483,647

(a) Function

- •This instruction executes position synchronization start-up to the XGB internal
- •At the rising edge of the input condition, synchronized start-up instruction is executed, where, the axis designated as AXIS is the sub-axis and that designated in the MST_AXIS is the main axis.

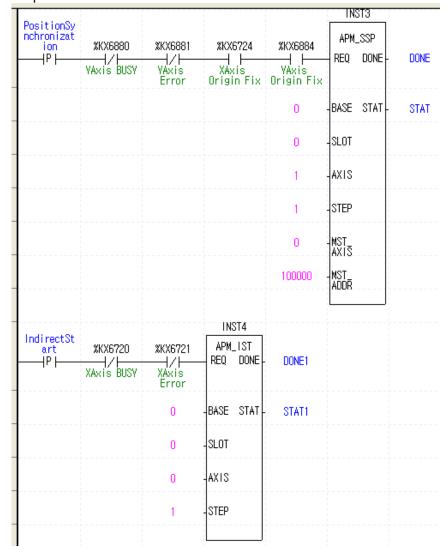
- •When the instruction is executed, the sub-axis does not out real pulses (at this time, the inoperation-state flag (X-axis: %KX6720, Y-axis: %KX6880) of the sub-axis is ON), and the STEP of the sub-axis starts up when the main axis MST_AXIS is at the position set up in the MST ADDR.
- •The position synchronization instruction can be executed only when the Origins for both of the main axis and sub-axis have been determined. if the Origin of the main axis or sub-axis has not been determined at the start of the APM SSP instruction, error code 346 or 344, respectively, will be outputted to STAT.
- •When using this instruction, set up the main axis and sub-axis with different axis. Otherwise, error code 347 will be outputted to STAT.
- •To cancel the execution of position synchronization instruction after it is given, execute the stop instruction (APM STP) to the sub-axis.

(2) Sample Instruction

•the sample program below shows the operation of the position synchronization start-up instruction.

(a) Sample Program

•In the sample program below, where the Y-axis is the sub-axis and X-axis is the main axis, when the main axis position is at 100,000, the operation data in the No. step of the sub-axis is started up.



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(b) Used Devices

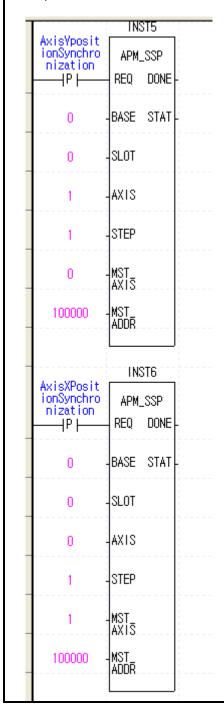
Device	Description	Data Size	Exemplary Setting		
Position Sync.	Position synchronization reference signal	BIT	-		
Indirect start	Main axis indirect start reference signal	BIT	-		
%KX6880	Sub-axis (Y-axis) position being controlled signal	BIT	-		
%KX6881	Sub-axis (Y-axis) in error state	BIT	-		
%KX6724	X-axis reference determined state	BIT	-		
%KX6884	Y-axis reference determined state	BIT	-		
%KX6720	Main axis (X-axis) position being controlled signal	BIT	-		
%KX6721	Main axis (X-axis) in error state	BIT	-		

(c) Program Operation

- •At the rising edge of the 'position synchronization' signal used as the position synchronization reference signal, APM_SSP instruction is executed.
 - At this time, since the AXIS is 1 (Y-axis), Y-axis is the sub-axis and as the MST_AXIS is 0 (X-axis), X-axis is the main axis.
- •At the rising edge of the 'indirect start-up' signal which is the indirect start-up reference signal of the main axis, No. 1 step of the X-axis starts indirectly.
- •During operation, when the present position of the main axis reaches 100,000 [Pulse] set up in the MAST ADDR of the APM SSP instruction, the Y-axis which is the sub-axis starts up the operation step (No. 1) set up in the STEP of the APM_SSP instruction.

•If the axis set up as the main axis has been started up as the sub-axis of position synchronization, error code 349 is outputted to STAT and the position synchronization instruction is not executed.

In the example shown below, at the rising edge of the 'Y-axis position synchronization,' position synchronization instruction is executed with the Y-axis as the sub-axis and the X-axis as the main axis. In this state, if a rising edge of the 'X-axis position synchronization' signal occur, the position synchronization instruction reference is generated with the X-axis as the sub-axis and the Y-axis as the main axis. In this case, because the Y-axis which is used as the main axis has already been started up as the sub-axis of the position synchronization instruction, the X-axis outputs error code 349 to the STAT1 and is not started.



5.3.12 Speed Synchronization Function Block

•This instruction (APM_SSSB) is for the operation at synchronized speed at the preset rate with the axis set up in the instruction as the sub-axis when the main axis is started up. For details of speed synchronization function, see 3.1.8.

(1) Speed Synchronization Start-up Instruction (APM_SSSB)

Form	Variable	Data Type	Description				
			Main axis setting range				
INST8 APM_SSS - REQ DONE -BASE STAT - MST_ AXIS -AXIS	_	USINT		Setting Value	Main Axis Setting	Setting Value	Main Axis Setting
				0	X-axis	5	High Speed Counter Ch3
				1	Y-axis	6	High Speed Counter Ch4
				2	High Speed Counter Ch0	7	High Speed Counter Ch5
				3	High Speed Counter Ch1	8	High Speed Counter Ch6
				4	High Speed Counter Ch2	9	High Speed Counter Ch7
-MST_ AXIS -MST_ RAT -SLV_ RAT	SLV_RAT	UINT	Speed ratio of sub-axis • Setting range: 1 ~ 10,000(0.01 ~ 100.00%)				
	DELAY	USINT	Sub-axis delay time • Setting range: 1 ~ 10(1 ~ 10ms)				

(a) Function

- •This is the instruction for executing speed synchronized start-up to the XGB internal positioning.
- •At the rising edge of the input condition, speed position synchronized start-up instruction is executed with the AXIS as the sub-axis and the axis designated in the MST_AXIS as the main axis.
- •When the instruction is executed, the sub-axis does not output real pulse (at this time, the inoperation-state flag (X-axis: %KX6720, Y-axis: %KX6880) of the sub-axis is ON), and when the main axis MST_AXI starts, the sub-axis starts at the speed synchronization ratio set up in the AXIS
- •The synchronization ratio which can be set up in the SLV_RAT is $0.01\% \sim 100.00\%$ (setting value $1 \sim 10,000$). If the setting exceeds this range, error code 356 is created.
- •The DELAY time is the time required for the speed of the sub-axis to reach the present speed of the main axis. In the XGB internal positioning function, for speed synchronization control, the present speed of the main axis is detected at every 500 μ s to control the speed of the sub-axis. Here, if the speed of the sub-axis is synchronized to that of the main axis without delay time, the motor and drive may receive excessive impact.
 - For example, when the speed synchronization ratio is 100.00% and delay time is 5[ms], and if the present speed of the main axis is 10,000[pps], XGB internal positioning adjusts the speed of the sub-axis so that it's speed is the same as that of the main axis after 5[ms] at every $500[\mu s]$.
 - When the delay time is longer, the synchronization time delay between the main and sub-axes is longer but the output pulse is more stable. If there is the possibility that the motor may lose synchronism, set the delay time longer.
- •The range of the delay time that can be set up in DELAY n2 is 1 ~ 10[ms]. If this range is exceeded, error code 357 is generated.

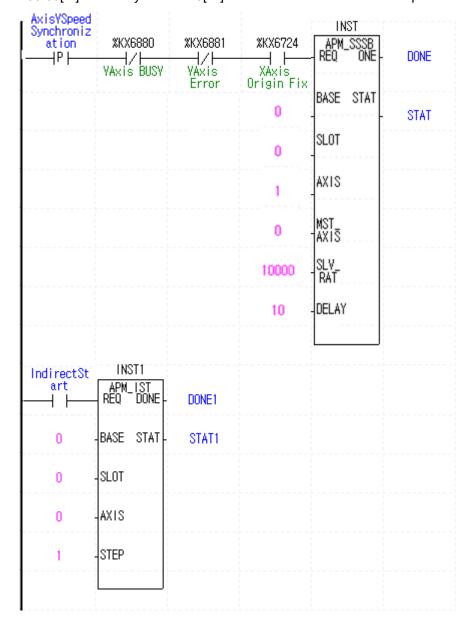
- •The range of the main axis setting of MST_AXIS is 0 ~ 9 as shown below. If this range is exceeded, error code 355 is generated.
- •To cancel the execution of speed synchronization instruction, run the stop instruction (APM STP) for the sub-axis.
- •Speed synchronization control can be executed even when the Origin of the sub-axis has not be determined.
- •In speed synchronization, the sub-axis is synchronized to the main axis. Therefore, even if the control mode of the sub-axis is set up position control, it repeats start and stop according to the operation of the main axis, and the direction of rotation of the sub-axis is the same as that of the main axis.
- •If the M code of the sub-axis is ON at the execution of the speed synchronization instruction, error code 353 is outputted to STAT.

(2) Sample Instruction

•The program below is to show exemplary operation of speed synchronization start instruction.

(a) Sample Program

- •In the sample program below with the Y-axis as the sub-axis and the X-axis as the main axis, the speed synchronization start-up is executed at the synchronization ratio of
- 100.00[%] and delay time of 10[ms] when the main axis is started-up.



Chapter 5 Positioning Instructions

(b) Program Operation

- •At the rising edge of the 'Y-axis speed synchronization' signal used as the speed synchronization reference signal, the APM_SSSB instruction is executed. Here, since the AXIS is 1 (Y-axis), Y-axis is the sub-axis and as the MST_AXIS is 0 (X-axis), X-axis is the main axis.
- •At the rising edge of the 'indirect start-up' signal which is the indirect start-up reference signal, the No. 1 step of the X-axis starts indirectly.
- •When the main axis starts up, Y-axis is started-up at the synchronization ratio of 100.00[%] set up in the third operand of the APM_SSSB instruction and synchronized to the main axis by 10[ms] of delay time.

5.3.13 Position Override Function Block

- •The position override instruction (APM POR) changes the target position of the axis which is presently in positioning operation to the target position set up in the instruction. For details, see 3.1.10.
- (1) Position Override Instruction (APM POR)

Form	Variable	Data Type	Description
INST2 APM_POR - REQ DONE BASE STAT -SLOT -AXIS POR ADOR	POR_ ADDR	DINT	Position • Setting range: -2,147,483,648 ~ 2,147,483,647

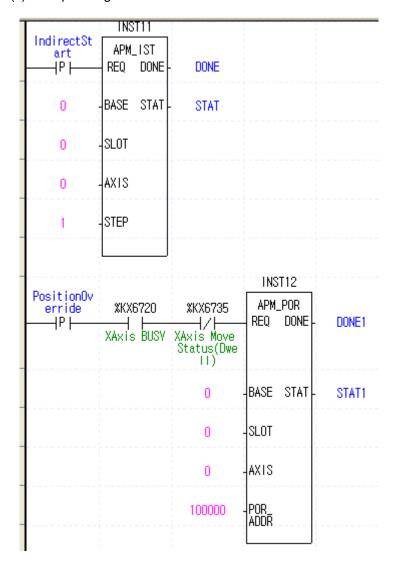
(a) Function

- •This instruction provides position override reference to the XGB internal positioning.
- •At the rising edge of the input condition, the axis designated as AXIS changes its target position to the position set up in the POR_ADDR during operation.
- •Position override instruction is available for the acceleration, constant speed, and deceleration sections of operation patterns. If position override instruction is executed during dwelling, error code 362 is outputted to STAT.

(2) Sample Instruction

•The sample program below show exemplary operation of position override.

(c) Sample Program



(d) Program Operation

- •At the rising edge of the 'indirect start-up' signal which is the reference signal for indirect start-up, positioning X-axis is started up indirectly by operation step No. 1.
- •If the rising edge of the 'position override reference' signal used as the reference signal for the position override instruction occurs before the present position reaches 100,000[Pulse] during operation, the operation continues by changing the target position of the step presently in operation to 100,000. Take care that the target position value of the No.1 step set up with the positioning parameter itself is not changed.
- •If position override instruction is executed after the present position has passed 100,000[Pulse], deceleration stop occurs.
- •If position override instruction is executed while the operation state is in dwelling, error code 362 is outputted to STAT. To prevent this, the start-up contact should be connected with the X-axis dwell status flag as normally closed (B contact) in the program.

5.3.14 Speed Override Function Block

•Speed override instruction (APM_SOR) changes the operating speed of the axis presently in positioning operation to the speed set up in the instruction line. For the details of speed override function, see 3.1.10.

(1) Speed Override Instruction (APM SOR)

Form	Variable	Data Type	Description
APM_SOR - REQ DONE - -BASE STAT - -SLOT -AXIS	SOR_ SPD	UDINT	Operating Speed • Setting range: 1~100,000

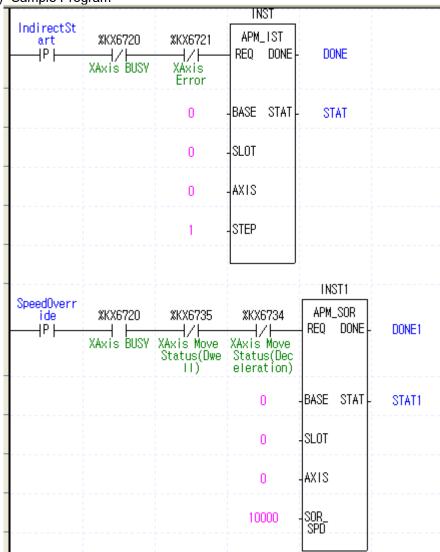
(a) Function

- •This instruction provides speed override reference to the XGB internal positioning.
- •At the rising edge of the input condition, the axis designated to be AXIS changes its operating speed to the speed set up in SOR_SPD.
- •Speed override instruction is available for the acceleration, constant speed, and deceleration sections of operation patterns. If speed override instruction is executed during deceleration or dwelling, error code 377 is outputted to STAT, and the present operating step does not stop and continues running.

(2) Sample Instruction

•The sample program below shows exemplary operation of speed override instruction.

(c) Sample Program



(d) Program Operation

- •At the rising edge of the indirect start-up signal used as the reference for indirect start up signal, positioning X-axis is started up indirectly by the operating step No. 1.
- •If the rising edge of the 'speed override reference' signal used as the reference signal for the speed override instruction occurs during operation, the operation continues by changing the operating speed of the present operation step to 10,000[pps]. Take care that the speed value of the No.1 step set up with the positioning parameter itself is not changed.
- •If speed override instruction is executed while the operation state is in deceleration or dwelling, error code 377 is outputted to STAT. To prevent this, the start-up contact should be connected with the X-axis dwell status flag as normally closed (B contact) in the program.

5.3.15 Positioning Speed Override Function Block

•This instruction (APM PSO) changes the operating speed of the axis which is presently in positioning operation, at the position specified in the instruction line. For the details of this function, see 3.1.10.

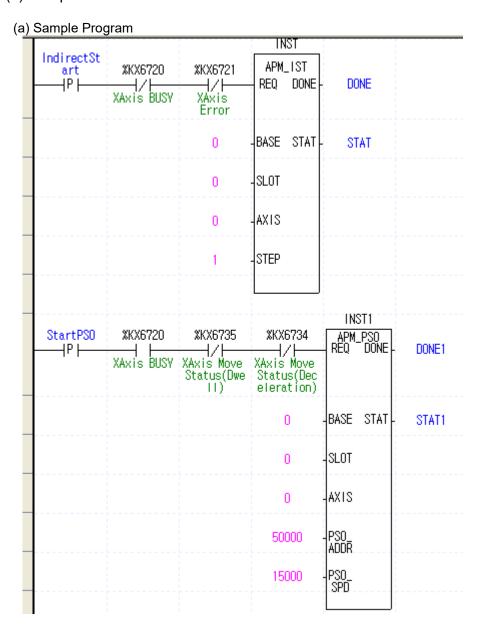
(1) Positioning Speed Override Instruction (APM PSO)

Form	Variable Data Type		Description
INST APM_PSO - REQ DONE -BASE STAT -SLOT	PSO_ADDR	DINT	Target position • Setting range: -2,147,483,648 ~ 2,147,483,647
-AXIS -PSO_ ADDR -PSO_ SPD	PSO_SPD	UDINT	Operating Speed • Setting range: 1~100,000

(a) Function

- •This instruction provides positioning speed override reference to the XGB internal positioning.
- •At the rising edge of the input condition, the axis designate as the AXIS executes positioning speed override. When the present position reaches the points set up in the PSO_ADDR during operation, present speed is overridden by the speed set up by the PSO SPD.
- •This instruction is available in the acceleration and constant speed sections of the operation patterns. If this override is executed during deceleration or dwelling, no error code is generated but the instruction is not executed.

(3) Sample Instruction



(b) Program Operation

- •At the rising edge of the 'Indirect Start-up' signal used as the indirect start-up reference signal, the positioning X-axis is started indirectly by operation step No.1.
- •If the rising edge of the 'PSO start reference signal, which is used as the reference signal for the positioning speed override instruction, occurs during operation, operation continues by changing the speed to 15,000[pps] at the moment when the position of the present operation step reaches 50,000.

5.3.16 Inching Start Function Block

•This instruction (APM_INC) is for the movement at the inching speed set up by the positioning Origin/manual parameter in the instruction. For details about inching operation, see 3.1.12.

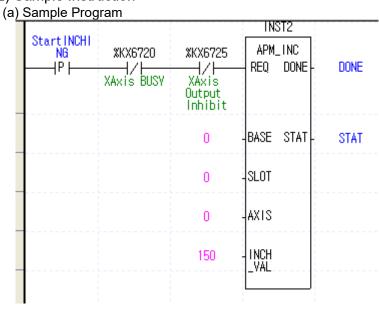
(1) Inching Start Instruction (APM_INC)

Form	Variable	Data Type	Description
INST APM_INC - REQ DONE - BASE STAT - -SLOT -AXIS -INCH _VAL	INCH_VAL	DINT	Inching Distance ■ Setting range: -2,147,483,648 ~ 2,147,483,647

(a) Function

- •This instruction provides inching operation reference to the XGB internal positioning.
- •At the rising edge of the input condition, the axis designated as AXIS moves by the distance and speed set up by the INCH_VAL and positioning parameter, respectively.

(2) Sample Instruction



(b) Program Operation

- •At the rising edge of the inching start signal used as the reference signal for inching start, the positioning X-axis moves by 150 at the inching speed in Incremental coordinate set up in the positioning Origin/manual parameter.
- •At inching start, if the axis is in operation or being prohibited from output, error codes 401 and 402, respectively, are outputted to STAT and does not operate.

5.3.17 Start Step Number Change Function Block

•This instruction (APM_SNS) changes the number of the step to be operated.

(1) Start Step No. Change Instruction (APM SNS)

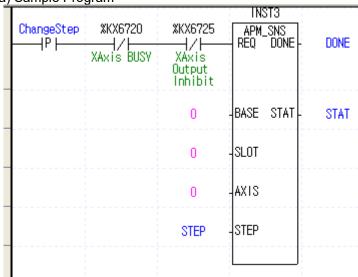
Form	Variable	Data Type	Description
INST APM_SNS REQ DONE BASE STAT - SLOT AXYS - STEP	STEP	UINT	Operation Step No. • Setting range: 1 ~ 80

(a) Function

- •This instruction provides start step change reference to the XGB internal positioning.
- •At the rising edge of the input condition, the present step number of the axis designated to be AXIS is changed to the step set up in the STEP.
- •If the axis has been in operation when this instruction is given, error code 441 is generated and the instruction is not executed. If the setting value in the STEP exceeds allowable range, error code 442 is generated and the instruction is not executed.

(2) Sample Instruction

(a) Sample Program



(b) Program Operation

•At the rising edge of the 'operation step change' signal used as the reference signal, the present operation step No. of the positioning X-axis is changed to the step No. set up in the STEP.

5.3.18 M Code Release Function Block

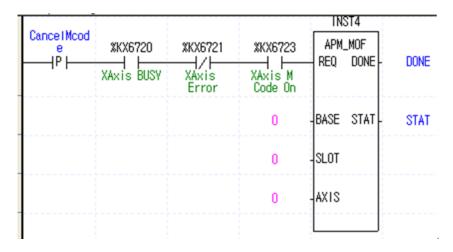
•This instruction (APM_MOF) cancels the M code generated during operation. For details of the M code, see 3.3.

(1) M Code Release Instruction (APM_MOF)

Form	Description
INST1 APM_MOF - REQ DONE - BASE STAT - -SLOT -AXIS	•This instruction provides M code release reference to the XGB internal positioning. •At the rising edge of the input condition, the M code On signal (X-axis: %KX6723, Y-axis: %KX6883) and the M code number (X-axis: %KW428, Y-axis: %KW438) of the axis designated as AXIS are cancelled.

(2) Sample Instruction

(a) Sample Program



(b) Program Operation

•At the rising edge of the 'M code release' signal used as the reference signal, and if M code is generated to the positioning X-axis, the ON signal and the number of the M code are cancelled.

5.3.19 Present Position Preset Function Block

- •This instruction (APM_PRS) changes present position.
- (1) Present Position Preset Instruction (APM PRS)

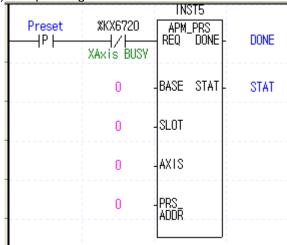
Form	Variable	Data Type	Description
INST APM_PRS REQ DONE BASE STAT -SLOT -AXIS -PRS ADOR	PRS_ADDR	DINT	Preset Value ■ Setting range: -2,147,483,648 ~ 2,147,483,647

(a) Function

- •This instruction provides position change reference to the XGB internal positioning.
- •At the rising edge of the input condition, the present position of the axis designated to be AXIS is changed to the position set up at the PRS_ADDR in the instruction line.
- •At this time, if the Origin has not been defined, the Origin determination status (X-axis: %KX6724, Y-axis: %KX6884) becomes ON.
- •It the axis has been in operation when this instruction is given, error code 451 is outputted to STAT and the instruction is not executed.

(2) Sample Instruction

(a) Sample Program



(b) Program Operation

• At the rising edge of the 'preset' signal, the position of the positioning X-axis is changed to 0 set up in the instruction and the reference determination state bit is ON.

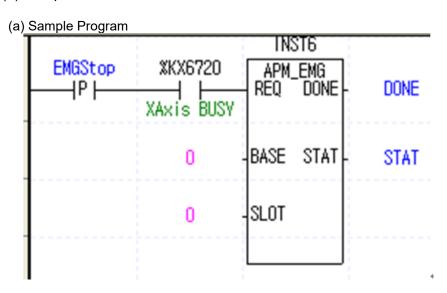
5.3.20 Emergency Stop Function Block

•Emergency stop instruction immediately stops present operation and cuts off output. For details of this function, see 3.1.11.

(1) Emergency Stop Instruction (APM EMG)

Form	Description
INST1 APM_EMG - REQ DONE - -BASE STATSLOT	 Provides emergency stop reference to the XGB internal positioning. At the rising edge of the input condition, both internal positioning X-axis and Y-axis are stopped without deceleration process, status flag (X-axis: %KX6725, Y-axis: %KX6885) is On, and error code 481 is outputted to STAT. When this instruction has been executed, output is cut off and Origin is undetermined. To resume operation, Origin must be determined by reference return, floating reference setting, or present position preset function.

(2) Sample Instruction



(b) Program Operation

•At the rising edge of the 'emergency stop' signal used as the reference signal, both X-axis and Yaxis of the XEC internal positioning stop operation immediately. Error code 481 is generated and output is cut off.

5.3.21 Error Reset, Output Cut-off Release Function Block

- •This instruction reset present error and releases output cut-off.
- (1) Error Reset Instruction (APM RST)

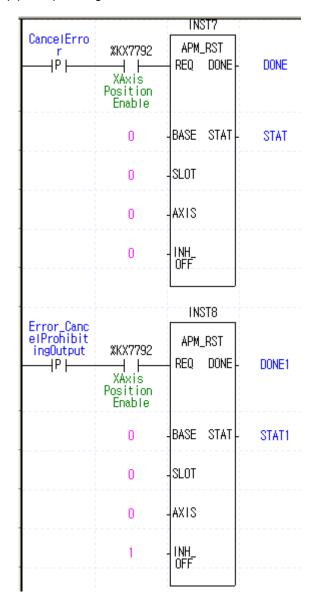
Form	Variable	Data Type	Description
INST APM_RST - REQ DONE - BASE STAT - -SLOT -AXIS - INH_OFF	INH_OFF	BOOL	Output cut-off release • Setting range: 0 ~ 1 (0: output cut-off not released, 1: output cut-off released)

(a) Function

- •This instruction provides error reset reference to the XGB internal positioning.
- •At the rising edge of the input condition, the error code applied to the axis designated as the AXIS is released. At this time, if the setting value of the INH_OFF is 0, only the error code is released but the output cut-off is maintained, and it the value is 1. output cut-off is released too.

(2) Sample Instruction

(a) Sample Program



(b) Program Operation

- •When error and output cut-off have been applied by emergency stop, at the rising edge of the 'error reset' signal which is used as the reference signal for error reset, the error code of the positioning X-axis only is released and the output cut-off is not released.
- •At the rising edge of the 'Error_Output Cut-off Release' signal used as the reference signal, both the error code and output cut-off of the positioning X-axis are released.

5.3.22 Parameter/Operation Data Write Function Block

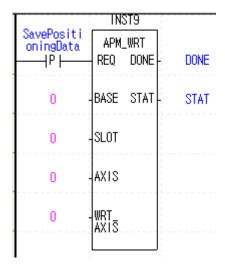
•Parameter Write instruction (APM_WRT) writes the operation data, which is changed during operation, of the positioning exclusive K area permanently in the built-in flash memory of the XGB. For the relation between the positioning exclusive K area and the positioning parameter, see 3.2.2.

(1) Parameter Write Instruction (APM WRT)

Form	Variable	Data Type	Description			
INST APM_WRT		,	positioning for position of the exclusive •At the rising education saves the open	oermanent pr K area. ge of the in ation data of	eservation of to out condition, the exclusive	ne XGB internal he operation data as shown below, K area respective vice of the XGB,
- REQ DONE -			K area to be preserved	Positioning Data	High Speed Counter Data	PID Control Data
-SLOT -AXIS -WRT_AXIS	WRT_AXIS	USINT	exclusive K area axis are permand If it is set to 1, the high speed the high speed of If it is set to 2, the high speed of the high speed	a of the posently stored and the setting date counter char ounter paramers setting date.	itioning functions the positioning the interesting it is the exclusional three interesting in the exclusion	ration data in the ns X-axis and Y-ng parameters. It is is K area of all depermanently as sive K area in the ently as the PID
			operand which o	loes not have instruction, ting range ((e influence on however, be 0 ~ 1), 11 is o	with AXIS is the the execution of careful that, if it utputted to STAT

(2) Sample Instruction

(a) Sample Program



(b) Program Operation

•At the rising edge of the 'store positioning data' signal used as the parameter saving reference signal, the operation data in the exclusive K area of the positioning functions X-axis and Y-axis are permanently stored as the parameters in the XGB's flash memory.

- •Take care that, when the APM WRT instruction is executed, the positioning parameters previously stored are replaced with the operation data of the exclusive K area.
- •Take care that when APM_WRT instruction is executed, the existing positioning parameters in the flash memory are replaced with the operation data in the exclusive K area, therefore, the scan time of the scan in which the instruction has been executed becomes longer.

5.3.23 Pulse Width Modulation

• Pulse Width Modulation is to operate On/Off output in designated Off duty rate and Output cycle.

(1) Pulse Width Modulation (APM PWM)

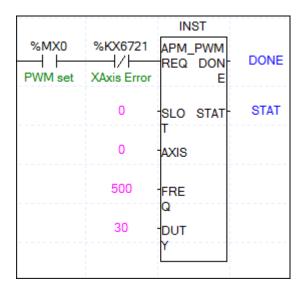
Form	Variable	Data Type	Description
INST1 -REQ DONESLOT STAT-	FREQ	WORD	Output cycle • Setting rage: 1~20,000(ms)
-FREQ	DUTY	WORD	Off duty rate ■ Setting range: 1 ~100(%)

(a) Fuction

- This instruction is for PWM output.
- While the input condition is On state, XGB postioning outputs pulse train in designated cycle time in FREQ and designated Off duty rate in DUTY at designated axis in AXIS
- During PWM output, current address don't change. Constant speed bit(X-axis: %K%6733, Yaxis: %KX6893) and Operation bit(X- axis: %KX6720, Y- axis: %KX6880) set On.

(2) Example of Use of the Instruction

(a) Sample Program

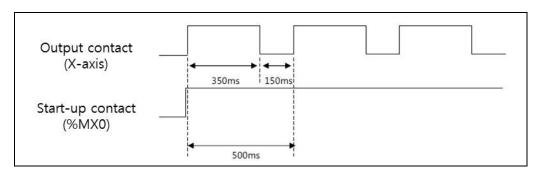


(b) Used Device

Device	설 명
MX0	PWM output reference signal
%KX6721	X-axis error state

(c) Operation of the Program

- While MX0 is On which is used as output reference signal, PWM is operated. (At this time, the X-axis is in operation or errorstatus, the instruction will not be executed.)
- If PWM executed, designated output cycle(500ms for this picture) and designated Off duty rate(30% for this picture)



- If APM PWM instruction is executed, other instruction do not operate. And upper/lower limit does not work
- If APM_PWM instruction is executed, STP, EMG instruction doesn't operate. To stop output, Off the Start-up contact
- If output cycle is changed, when operating APM_PWM, it cannot be applied.
- · PWM applicable version
- -XEC-DN/DPxxH: O/S from V1.50
- -XEC-DN/DPxxSU: O/S from V1.00

Chapter 6 Positioning Monitoring Package

6.1 Introduction to Positioning Monitoring Package

You can monitor the status of XGB PLC built-in positioning and carry out test operation without the program by changing the parameters and operation data if you use the XGB monitoring package.

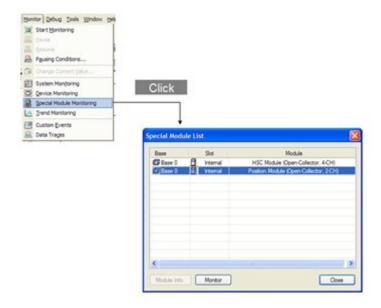
6.1.1 Introduction of Positioning Monitoring Package

- You can easily and conveniently monitor the current positioning operation or change the parameter or operation data by using the following positioning monitoring package with XGB PLC connected to XG5000.
- If you use the positioning monitoring package, you can easily carry out test operation without the program, adjust the parameter and operation data, and permanently save it in PLC after the adjustment.
- This chapter describes how to run the XGB positioning monitoring package.
- XGB positioning monitoring package is available with over XG5000 V1.2 (over V2.2 for XBCH, over V3.0 for XECH, over V3.4 for XBCS, over V3.7 for XECS), and it is carried out in the following sequence. (This manual has been made by using XG5000 V2.2)

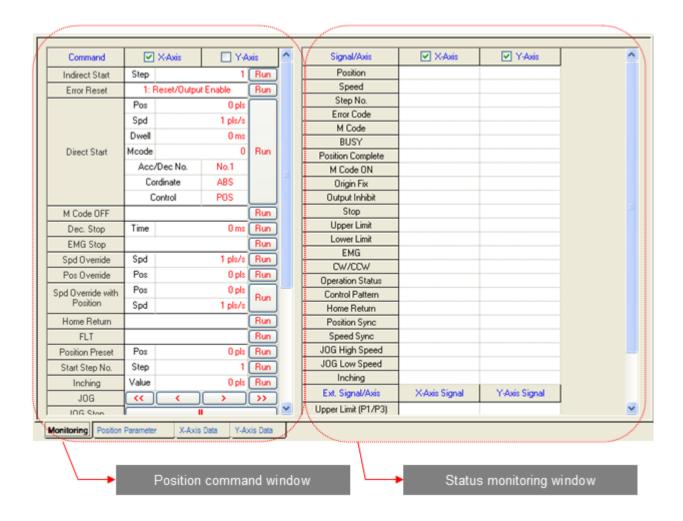
(1) Opening the Monitoring Package

Select 'Monitoring' → 'Special Module Monitoring' with XGB PLC connected to XG5000, the special module monitoring display is invoked as follows.

(If XGB is not connected to XG5000, 'Special Module Monitoring' is inactivated in the 'Monitoring' menu. Thus make sure that XGB is connected to XG5000 before using positioning monitoring.)



 When you want to carry out the positioning monitoring package, double click on the positioning module or select the positioning module, and then click on the 'Monitoring' button at the bottom. And the positioning monitoring package is started as follows.



• The menu and function of the positioning monitoring package are as follows.

Items	Functions	Remark
Monitoring	Monitors the positioning of the axis or gives commands.	
Position Parameter	Checks and modifies the positioning parameter of each axis.	
X-Axis Data	Checks and modifies the operation data of axis X.	
Y-Axis Data	Checks and modifies the operation data of axis Y.	
Start Monitor	Carried out positioning monitoring.	
Stop Monitor	Stops positioning monitoring.	
Write PLC	Permanently saves the changed parameter and operation data in PLC.	WRT function
Save Project	Saves the changed parameter and operation data in XG5000 project.	

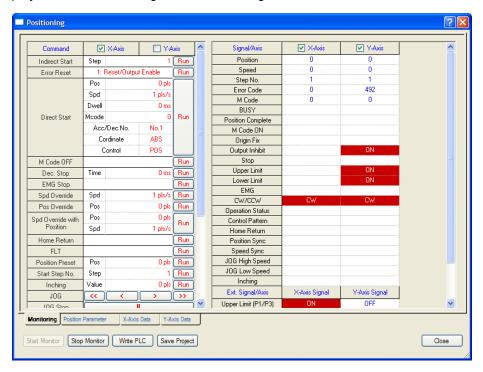
• For details of each menu, refer to 6.2.

6.2 Menus and Functions of Positioning Monitoring

The following is the function and use of the menus of the XGB monitoring package.

6.2.1 Monitoring and Command

- The positioning monitoring package consists of the command window for positioning test operation and positioning monitoring window as shown above.
- If you click on the 'Start Monitor' button at the left bottom of the package, the monitoring and command function is activated to make various commands and current status monitoring functions available.
- If you start the command on the left, the corresponding functions are activated without the program and the status is displayed on the monitoring window on the right.



(1) Positioning Command

- The commands available in the positioning monitoring package are as follows.
- To execute an command, enter the setting of the command, and click on the 'Run' button (「<<」,「<」, 「|」,「>」,「>>」 during jog operation).

Item	Description	Command	Remark
Indirect start	Direct start with the operation step set in the monitoring window		5.2.4
		APM_IST	5.3.5
Error reset	Resets the error code and output inhibition in case of an error	CLR	5.2.20
		APM_RST	5.3.21
Direct start	Directly starts with the position, speed, dwell, M code, acc./dec. number, coordinates and control method set in the monitoring window	DST APM_DST	5.2.3 5.3.4
M code OFF	Cancels the M code On signal and M code number	MOF APM_MOF	5.2.17 5.3.18
Dec. stop	Carries out deceleration stop in the set deceleration time	STP	5.2.9
		APM_STP	5.3.10
EMG stop	Stops the operation of the axis and inhibits pulse output	EMG	5.2.19
		APM_EMG	5.3.20

Item		I	Description			Command	Remark	
Spd override	Overrides the	Overrides the speed at the set speed value						
Pos override	Overrides the	position at the	e set position	า value		POR APM_POR	5.2.12 5.3.13	
Spd override with position	Changes the position	operation spe	eed at the s	peed value se		PSO APM_PSO.	5.2.14 5.3.15	
Home return	Conducts hor positioning pa		the home	return method		ORG APM_ORG	5.2.1 5.3.2	
FLT	Sets the curre	nt position as	the fixed ho	me		FLT APM_FLT	5.2.2 5.3.3	
Position preset	Presets the cu	ırrent position	with the set	value		PRS APM_PRS	5.2.18 5.3.19	
Start step No.	Changes the	start step with	the set step			SNS APM_SNS	5.2.16 5.3.17	
Inching	Conducts inch the inching sp	• .	· ·	osition (inching parameter	amount) at	INCH APM_INC	5.2.15 5.3.16	
	Conducts jog	operation at th	ne jog speed	set in the para	ameter	-		
log	<<	(Ш	>	>>			
Jog	Reverse high speed	Reverse low speed	Jog stop	Normal low speed	Normal high speed			
Spd position conversion	Changes from	speed contro	l to position	control		VTP APM_VTP	5.2.7 5.3.8	
Position spd conversion	Changes from	position cont	rol to speed	control		PTV APM_PTV	5.2.8 5.3.9	
Spd synchronous operation		Speed synchronous operation at the set main axis, speed ration and delay time						
Position synchronous operation	Speed synch position	SSP APM_SSP	5.2.10 5.3.11					
Simultaneous start	Simultaneous	SST APM_SST	5.2.6 5.3.7					
Straight interpolation operation	Straight interpoperation step	•	ation for ax	es X and Y w	vith the set	LIN APM_LIN	5.2.5 5.3.6	

Remark

- Note that the positioning command through the XGB positioning monitoring package is executed regardless of the operation mode of PLC.
- If the PLC operation mode is Run mode, the positioning command is executed in the positioning monitoring package, and if a different command is executed in the instruction of the program, XGB PLC executes them both.

Therefore, in such a case, it might operate differently from the intent of the user or an error might occur.

Note that if you use the positioning monitoring package, positioning by the instruction in the program is not executed.

(2) Positioning Monitoring Window

- The monitoring window on the right of the monitoring package displays the current status according to the positioning command.
- The information displayed in the positioning monitoring window is as follows.

(a) In case of XBM/XBC

Item	Diaplaya	Relate	Remark	
nem	Displays	Axis X	Axis Y	Remark
Current position	Current position of each axis	K422	K432	DINT
Current speed	Current speed of each axis	K424	K434	DINT
Step No.	Currently operating step of each axis	K426	K436	WORD
Error code	Error code in case of an error of the axis	K427	K437	WORD
M code	M code of the currently operating step	K428	K438	WORD
Busy	Whether the axis is operating	K4200	K4300	BIT
Positioning complete	Whether the positioning has been completed for the axis	K4202	K4302	BIT
M code On	M code On/Off of the currently operating step	K4203	K4303	BIT
Origin fix	Whether the origin has been fixed	K4204	K4304	BIT
Output inhibit	Whether output is inhibited	K4205	K4305	BIT
Upper limit detection	Whether the upper limit is detected	K4208	K4308	BIT
Lower limit detection	Whether the lower limit is detected	K4209	K4309	BIT
EMG stop	Emergency stop	K420A	K430A	BIT
Normal/reverse rotation	Normal and reverse rotation	K420B	K430B	BIT
Operation status	The operation status of each axis (acc., dec., constant speed, and dwell)	K420C~ K420F	K430C~ K430F	BIT
Control pattern	Operation control pattern of each axis (position, speed, interpolation)	K4210~ K4212	K4310~ K4312	BIT

ltana	Diambaya	Relate	Damanic	
Item	Displays	Axis X	Axis Y	Remark
Home return	Whether home return is being conducted	K4215	K4315	BIT
Position Sync	Whether position synchronization is being conducted	K4216	K4316	BIT
Speed Sync	Whether position synchronous operation is being conducted	K4217	K4317	BIT
Jog high speed	Whether jog high speed operation is being conducted	K4219	K4319	BIT
Jog low speed	Whether jog low speed operation is being conducted	K4218	K4318	BIT
Inching	Whether inching operation is being conducted	K421A	K431A	BIT

(b) In case of XEC

Item	Displaye	Relate	Remark	
Item	Displays	Axis X	Axis Y	Nemain
Current position	Current position of each axis	%KD211	%KD216	DINT
Current speed	Current speed of each axis	%KD212	%KD217	DINT
Step No.	Currently operating step of each axis	%KW426	%KW436	WORD
Error code	Error code in case of an error of the axis	%KW427	%KW437	WORD
M code	M code of the currently operating step	%KW428	%KW438	WORD
Busy	Whether the axis is operating	%KX6720	%KX6880	BIT
Positioning complete	Whether the positioning has been completed for the axis	%KX6722	%KX6882	BIT
M code On	M code On/Off of the currently operating step	%KX6723	%KX6883	BIT
Origin fix	Whether the origin has been fixed	%KX6724	%KX6884	BIT
Output inhibit	Whether output is inhibited	%KX6725	%KX6885	BIT
Upper limit detection	Whether the upper limit is detected	%KX6728	%KX6888	BIT
Lower limit detection	Whether the lower limit is detected	%KX6729	%KX6889	BIT
EMG stop	Emergency stop	%KX6730	%KX6890	BIT
Normal/reverse rotation	Normal and reverse rotation	%KX6731	%KX6891	BIT
Operation status	The operation status of each axis (acc., dec., constant speed, and dwell)		%KX6892 ~	BIT
	opeca, and awon)	%KX6735	%KX6895	
Control pattern	Control pattern Operation control pattern of each axis (position, speed, interpolation)		%KX6896 ~	BIT
	. ,	%KX6738	%KX6898	c

6-6

Chapter 6 Positioning Monitoring Package

14	Diamlassa	Relate	D	
Item	Displays	Axis X	Axis Y	Remark
Home return	Whether home return is being conducted	%KX6741	%KX6901	BIT
Position Sync	Whether position synchronization is being conducted	%KX6742	%KX6902	BIT
Speed Sync	Whether position synchronous operation is being conducted	%KX6743	%KX6903	BIT
Jog high speed	Whether jog high speed operation is being conducted	%KX6744	%KX6904	BIT
Jog low speed	Whether jog low speed operation is being conducted	%KX6745	%KX6905	BIT
Inching	Whether inching operation is being conducted	%KX6746	%KX6906	BIT

(3) Positioning External Input Signal Monitoring

• The external signal monitoring at the bottom of the monitoring window displays the status of the external input contact point, which is the fixed input contact point for the axes as follows.

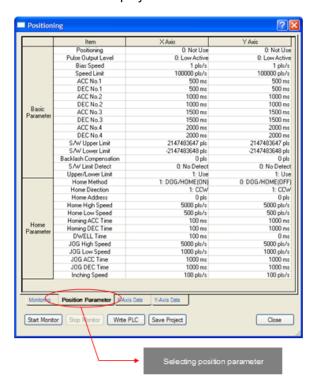
lkowa	Diamlassa	Turne	Conta	ct No.	Demont	
Item	Displays	Туре	Axis X	Axis Y	Remark	
		XBM	P00001	P00003		
Upper limit signal	External upper limit signal status of the axes	XBC	P00009	P0000B		
		XEC	%IX0.0.9	%IX0.0.11		
		XBM	P00000	P00002		
Lower limit signal	External lower limit signal status of the axes	XBC	P00008	P0000A		
orginal		XEC	%IX0.0.8	%IX0.0.10		
		XBM	P00004	P00006		
Approximate origin signal	Approximate origin signal status of the axes	XBC	P0000C	P0000E		
		XEC	%IX0.0.12	%IX0.0.14		
		XBM	P00005	P00007		
Origin signal	Origin signal status of the axes	XBC	P0000D	P0000F		
		XEC	%IX0.0.13	%IX0.0.15		

6.3 Parameter/Operation Data Setting Using Monitoring Package

You can change the positioning parameter and operation data of XGB PLC and do test operation by using the XGB monitoring package.

6.3.1 Changing the Position Parameter

- (1) How to Change the Parameter
 - You can change the position parameter by using the position monitoring package. Note that the change of the parameter is applied when the next operation is started after the currently operating step ends.
 - If you select 'Position Parameter' tab in the positioning monitoring package, the window appears where you can change the positioning basic parameter and the origin/manual parameter and the parameter saved in XG5000 is displayed as well.



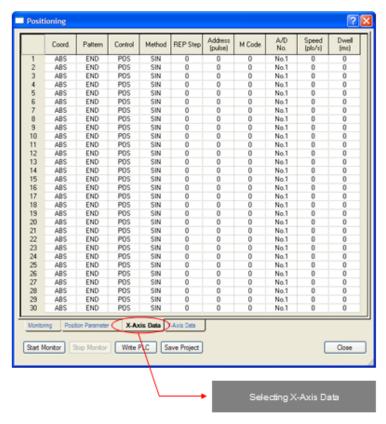
To change the parameter, first of all, change the parameter value to change, and select 'Write PLC'.
Then the changed parameter is transferred to PLC, the position parameter saved in PLC is changed,
and the parameter and operation data that have been changed are applied when the next operation
step is started.

Remark

- If you execute 'Write PLC,' the position parameter set in the positioning monitoring package and the operation data of each axis are all transferred to XGB.
- The parameter and operation data displayed when the positioning monitoring package is executed are not the data read from XGB but the parameter and operation data currently saved in XG5000. Therefore if you change the parameter or operation data in the positioning monitoring package and save them in the XGB PLC, be sure to press the 'Save Project' button to save them in the XG5000 project. Otherwise the settings of XG5000 might be different from XGB.

6.3.2 Change of Position Operation Data

- (1) How to Change the Position Operation Data
 - You can change the operation data of each axis during operation by using the positioning monitoring package. Note that the change of the operation data is applied when the next operation is started after the currently operating step ends.
 - If you select the 'axis X data' or 'axis Y data' tabs in the positioning monitoring package, the window is invoked where you can set the operation data of each axis as follows along with the operation data saved in XG5000.



• To change the operation data, first of all, change the operation data value to change, and select 'Write PLC'. Then the changed operation data is transferred to PLC, the operation data saved in PLC is changed, and the parameter and operation data that have been changed are applied when the next operation step is started

Remark

- If you execute 'Write PLC,' the position parameter set in the positioning monitoring package and the operation data of each axis are all transferred to XGB.
- The parameter and operation data displayed when the positioning monitoring package is executed
 are not the data read from XGB but the parameter and operation data currently saved in XG5000.
 Therefore if you change the parameter or operation data in the positioning monitoring package
 and save them in the XGB PLC, be sure to press the 'Save Project' button to save them in the
 XG5000 project. Otherwise the settings of XG5000 might be different from XGB.
- For details, refer to 3.2. and 3.3.

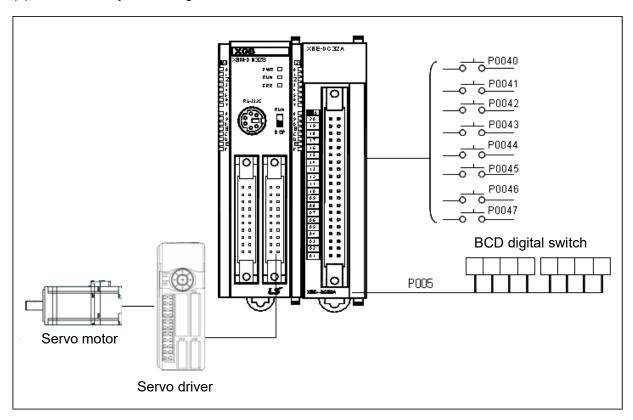


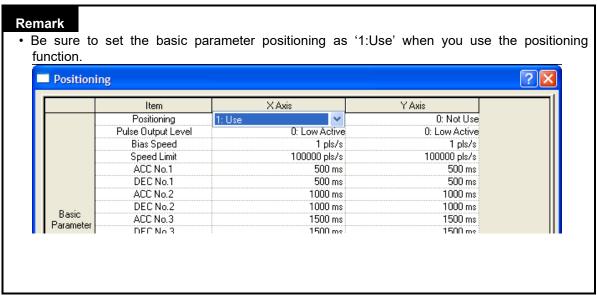
Chapter 7 Program Examples of Positioning

This chapter describes the program examples of the instructions of XGB positioning function.

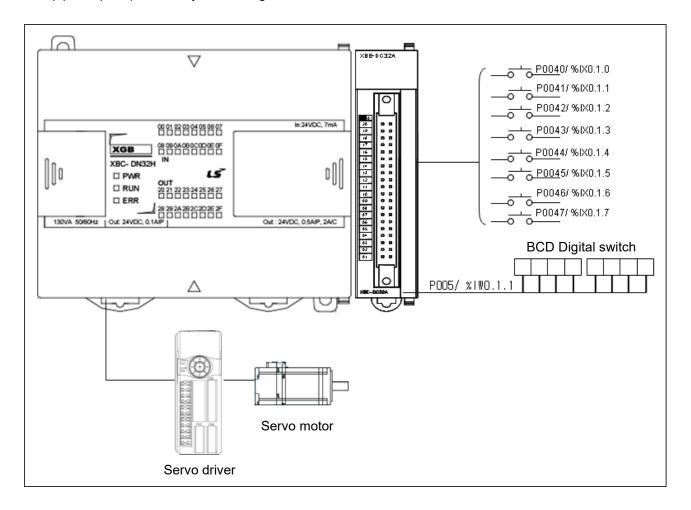
7.1 System Composition and Setting of Input and Output

- This section describes the setting of the positioning system and the input and output signals for the program example of XGB positioning. If there is no separate description, all the example programs addressed in Chapter 7 were made according to the settings of the input and output signals described in this chapter.
 - (1) XBM-DNxxS system configuration





(2) XBC(XEC)-DNxxH system configuration

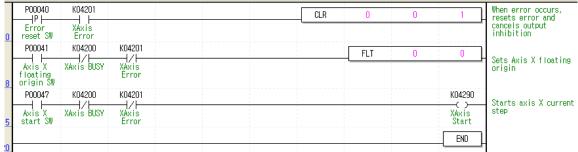


7.2 Program Examples

7.2.1 Floating Origin Setting/Single Operation

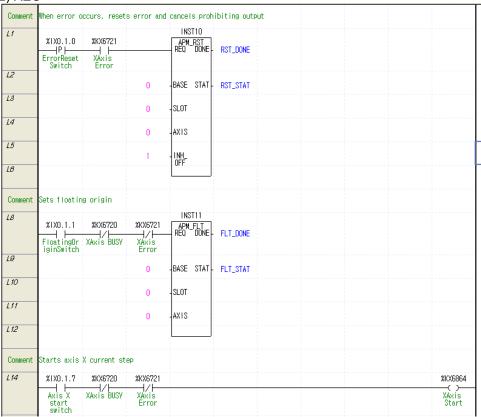
• The example program of the single operation after the floating origin setting by using the XGB positioning function is as follows.





(a) Berness es	
Device	Description
P0040	Axis X error reset, output inhibition cancel switch
P0041	Axis X axis X floating origin switch
P0047	Start switch of axis X
K4200	Signal during axis X operation
K4201	Error signal of axis X
K4290	Axis X start





(a) Devices Used

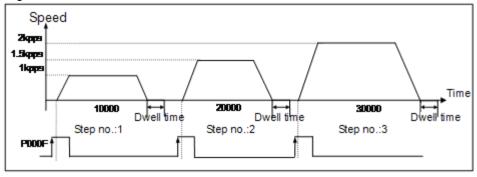
Device	Description
%IX0.1.0	Axis X error reset, output inhibition cancel switch
%IX0.1.1	Axis X axis X floating origin switch
%IX0.1.7	Start switch of axis X
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X
%KX6864	Axis X start

(3) Operation Data Setting

Step No.	coordi nates	Control pattern	Operatio n pattern	Operatio n type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time
1	Abso lute	Position control	End	Single	0	10,000	0	1	1000	100
2	Abso lute	Position control	End	Single	0	20,000	0	1	1500	100
3	Abso lute	Position control	End	Single	0	30,000	0	1	2000	100

(4) Operation Sequence

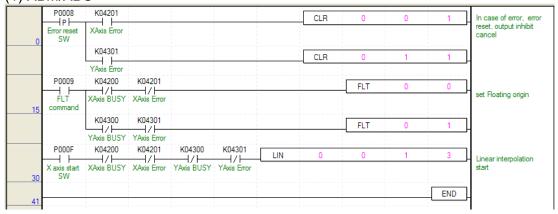
- P0041/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position
- 3 times of P0047/%IX0.1.7 (start) switch On: 3 times of single operation (steps 1~3). If it is operating now, the start instruction is not executed.



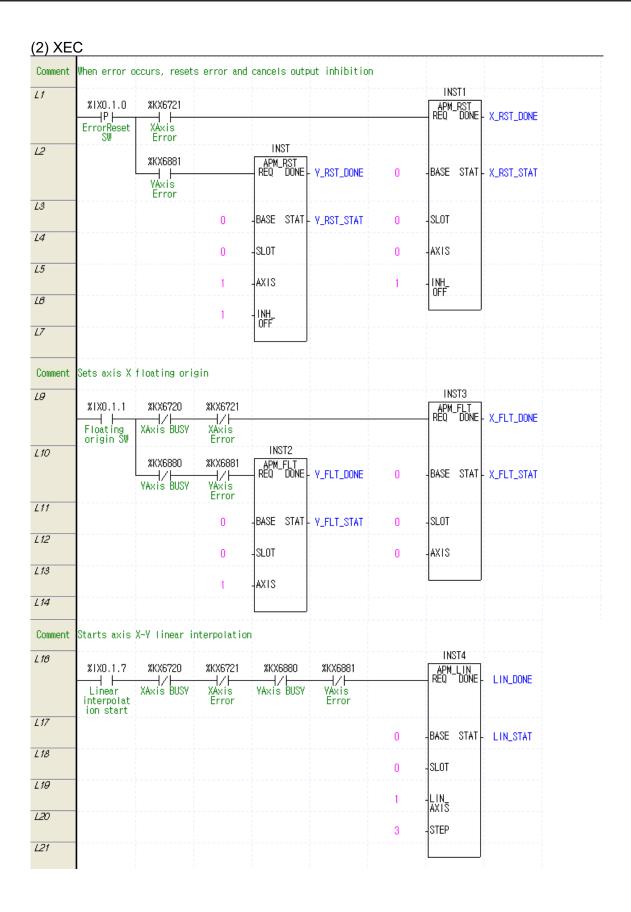
7.2.2 Straight Interpolation Operation

• The example program of the straight interpolation operation after the floating origin is set is as follows.

(1) XBM/XBC



Device	Description
P0008	Axis X error reset, output inhibition cancel switch
P0009	floating origin switch
P000F	Straight interpolation start switch
K4200	Signal during operation of axis X
K4201	Signal of axis X error
K4300	Signal during operation of axis Y
K4301	Signal of axis Y error



(a) Devices Used

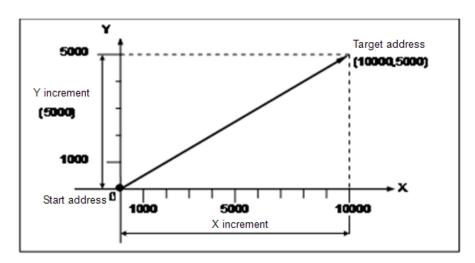
Device	Description
%IX0.1.0	Axis X error reset, output inhibition cancel switch
%IX0.1.1	floating origin switch
%IX0.1.7	Straight interpolation start switch
%KX6720	Signal during operation of axis X
%KX6721	Signal of axis X error
%KX6880	Signal during operation of axis Y
%KX6881	Signal of axis Y error

(3) Operation Data Setting

<u> </u>	9										
Axis	Step No.	coordinat es	Control pattern	Operation pattern	Operation type	Repeat step Target position [pulse]		M code	Acc./Dec. No. Operation speed [pls/s]		Dwell time [ms]
Х	1	Absolute	Position control	End	Single	0	10,000	0	1	1000	100
Υ	1	Absolute	Position control	End	Single	0	5,000	0	1	1000	100

(4) Operation Sequence

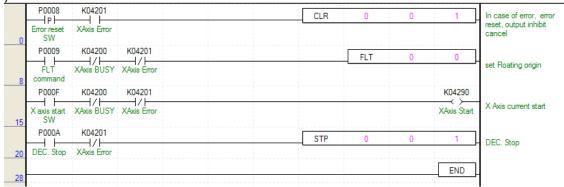
- P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- P000E/%IX0.1.7 (straight interpolation start) switch On : the straight interpolation start of axes X-Y is started.



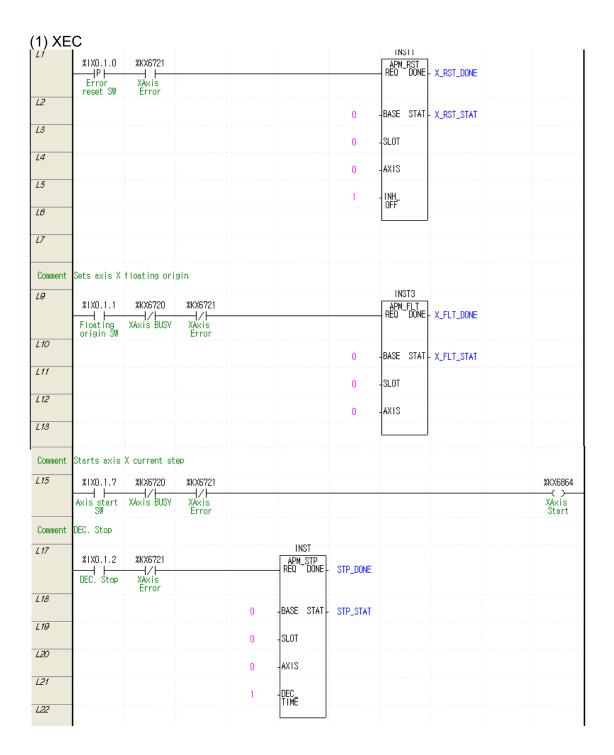
7.2.3 Deceleration Stop

• The example program of deceleration stop during operation is as follows.

(1) XBM/XBC



Device	Description					
P0008	O08 Axis X error reset, output inhibition cancel switch					
P0009	axis X floating origin switch					
P000A	axis X deceleration stop switch					
P000F	axis X start switch					
K4200	Signal during axis X operation					
K4201	Error signal of axis X					



Device	Description						
%IX0.1.0	%IX0.1.0 Axis X error reset, output inhibition cancel switch						
%IX0.1.1	axis X floating origin switch						
%IX0.1.2	axis X deceleration stop switch						
%IX0.1.7	axis X start switch						
%KX6720	Signal during axis X operation						
%KX6721	Error signal of axis X						

(3) Operation Data Setting

Step coordina No. tes		Control pattern	Operatio n pattern	Operatio n type Repeat step		Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time [ms]
1	Absolute	Position control	End	Single	0	10,000	0	1	1000	100

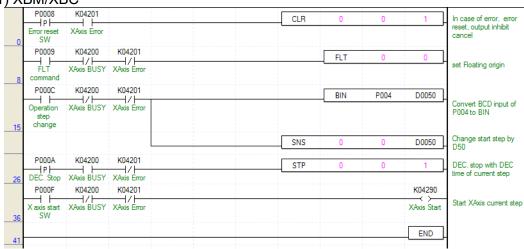
(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000F/%IX0.1.7 (start) switch On: indirect start of axis X is started.
- •P000A/%IX0.1.2 (deceleration stop) switch On: Since the deceleration time is not 0 when the deceleration stop instruction is given, it does deceleration stop for the deceleration time (100ms) of the currently operating step.

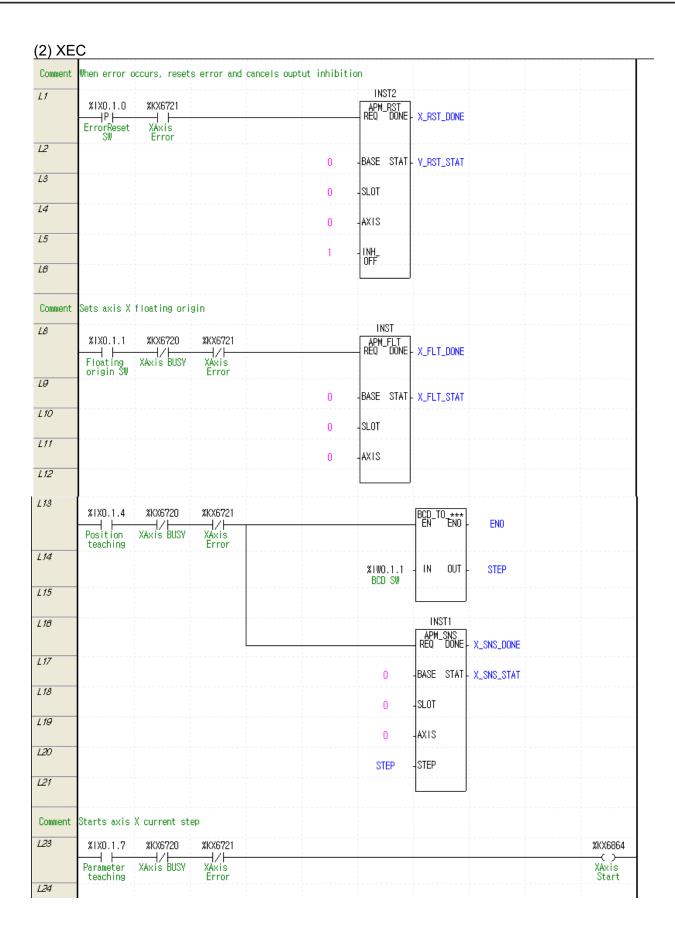
7.2.4 Setting of Operation Step/Single Operation

• The example program of conducting the single operation by setting the operation step is as follows.





Device	Description					
P0008	Error reset, output inhibition cancel switch					
P0009	Floating origin switch					
P000C	Operation step change switch					
P000F	axis X start switch					
K4200	Signal during axis X operation					
K4201	Error signal of axis X					



Device	Description
%IX0.1.0	Error reset, output inhibition cancel switch
%IX0.1.1	Floating origin switch
%IX0.1.4	Operation step change switch
%IX0.1.7	axis X start switch
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X

(3) Operation Data Setting

<u> </u>) Operation Bata details										
Step No.	coordi nates	Control pattern	Operatio n pattern	Operatio n type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time [ms]	
1	Abs olute	Position control	End	Single	0	10,000	0	1	1,000	100]-
2	Abs olute	Position control	End	Single	0	20,000	0	1	1,500	100	
3	Abs olute	Position control	End	Single	0	30,000	0	1	2,000	100	
10	Abs olute	Position control	End	Single	0	50,000	0	1	1,000	100	
11	Abs olute	Position control	End	Single	0	60,000	0	1	1,500	100	
12	Abs olute	Position control	End	Single	0	70,000	0	1	2,000	100	

(4) Operation Sequence

- P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- BCD/SNS_STEP switch input: enters the operation step to change in P004(enters 10 in this example).
- P000C/%IX0.1.4(operation step change) switch On: the currently operating step changes into 10.
- P000F/%IX0.1.7(axis X start) On: indirect start is conducted with the changed step (10).

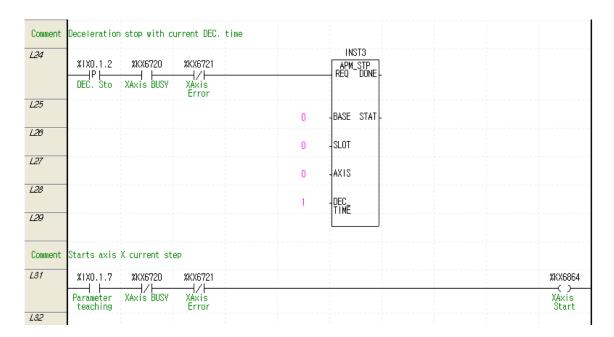
7.2.5 Setting of Operation Step/Speed Control

• The program example of conducting speed control by setting the operation step is as follows.



Device	Description					
P0008	Error reset, output inhibition cancel switch					
P0009	floating origin switch					
P000C	Operation step changing switch					
P000F	axis X start switch					
P000A	Deceleration stop switch of axis X					
K4200	Signal during axis X operation					
K4201	Error signal of axis X					

(2) XEC hen error occurs, resets error and cancels ouptut inhibition INST2 Lf APM_RST REQ DONE X_RST_DONE %KX6721 12 BASE STAT V_RST_STAT L3 SLOT L4 AXIS L5 INH_ OFF LΘ Sets axis X floating origin Comment L8 %KX6720 %KX6721 APM_FLT REQ DONE X_FLT_DONE Floating XAxis BUSY origin SW LΘ BASE STAT X_FLT_STAT L10 SLOT 0 L11 AXIS L12 Changes BCD SW input into BIN Changes start step number by value of STEP Comment L14 %KX6720 %IXO.1.4 %KX6721 EN0 XAxis BUSY L15 %IWO.1.1 BCD SW IN OUT STEP L18 L17 X_SNS_DONE L18 0 BASE STAT X_SNS_STAT L19 SLOT 0 L20 0 AXIS L21 STEP STEP L22



Device	Description
%IX0.1.0	Error reset, output inhibition cancel switch
%IX0.1.1	floating origin switch
%IX0.1.4	Operation step changing switch
%IX0.1.7	axis X start switch
%IX0.1.2	Deceleration stop switch of axis X
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X

(3) Operation Data Setting

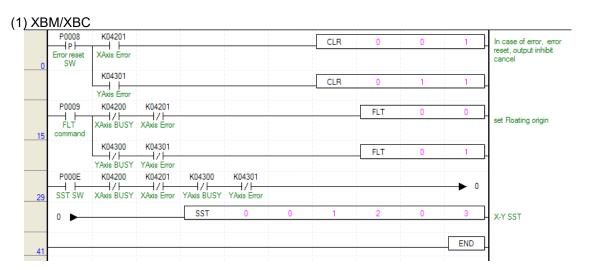
	- 1 J									
Step No.	coordi nates	Control pattern	Operatio n pattern	Operatio n type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time [ms]
1	Abs olute	Position control	End	Single	0	10,000	0	1	1,000	100
2	Abs olute	Position control	End	Single	0	20,000	0	1	1,500	100
3	Abs olute	Position control	End	Single	0	30,000	0	1	2,000	100
10	Abs olute	Speed control	End	Single	0	50,000	0	1	1,000	100
11	Abs olute	Position control	End	Single	0	60,000	0	1	1,500	100
12	Abs olute	Position control	End	Single	0	70,000	0	1	2,000	100

(4) Operation Sequence

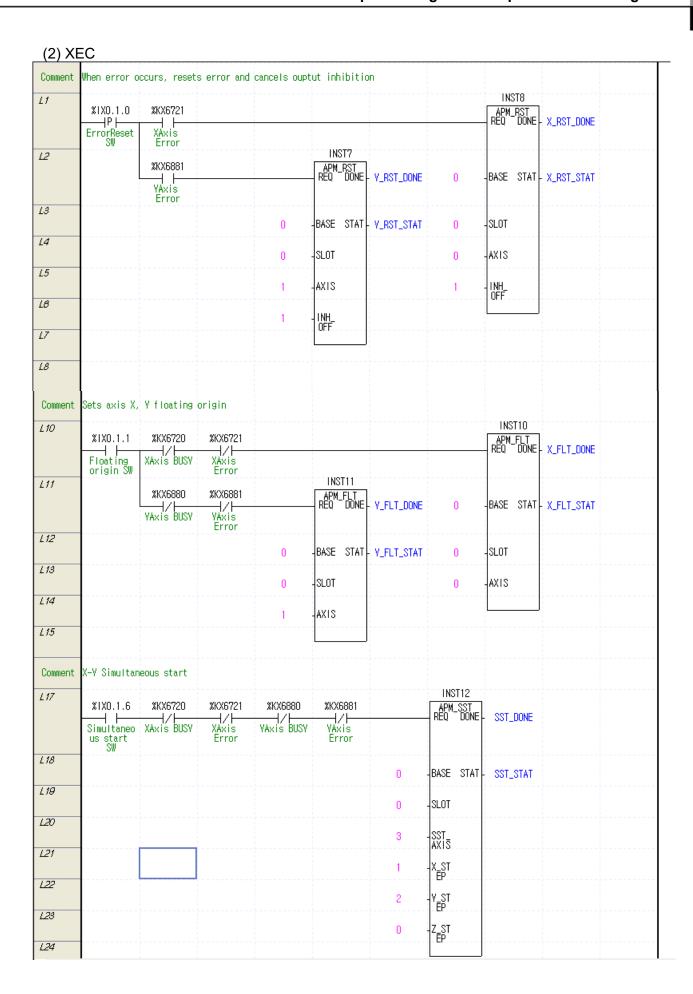
- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •BCD/SNS STEP switch input: enters the operation stop to change in P004 (enters 10 in this example).
- •P000C/%IX0.1.4 (operation step change) switch On: the current operating step changes into 10.
- •P000F/%IX0.1.7(axis X start) On: indirect start is conducted with the changed step (10).
- •P000A/%IX0.1.2 (deceleration stop) switch On: axis X, which is being operated with speed control, is decelerated and stopped by the deceleration time of the current step.

7.2.6 Simultaneous Start

• The program example of simultaneous start of axes X, Y is as follows.



Device	Description
P0008	axes X and Y error reset, output inhibition cancel switch
P0009	axes X and Y floating origin switch
P000E	simultaneous start switch of axes X and Y
K4200	Signal during axis X operation
K4201	Error signal of axis X
K4300	Signal during axis Y operation
K4301	Axis Y error signal



Device	Description
%IX0.1.0	axes X and Y error reset, output inhibition cancel switch
%IX0.1.1	axes X and Y floating origin switch
%IX0.1.6	simultaneous start switch of axes X and Y
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X
%KX6880	Signal during axis Y operation
%KX6881	Axis Y error signal

(3) Operation Data Setting

 <u> </u>											
Axis	Step No.	coordinat es	Control pattern	Operation pattern	Operation type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time [ms]
Х	1	Absolu te	Position control	End	Single	0	10,000	0	1	1000	100
Υ	2	Absolu te	Position control	End	Single	0	20,000	0	1	2000	100

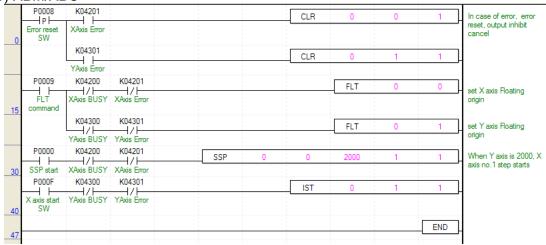
(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000F/%IX0.1.6 (simultaneous start) switch On : axis X simultaneously starts step 1, and axis Y does step 2.

7.2.7 Position Synchronous Start

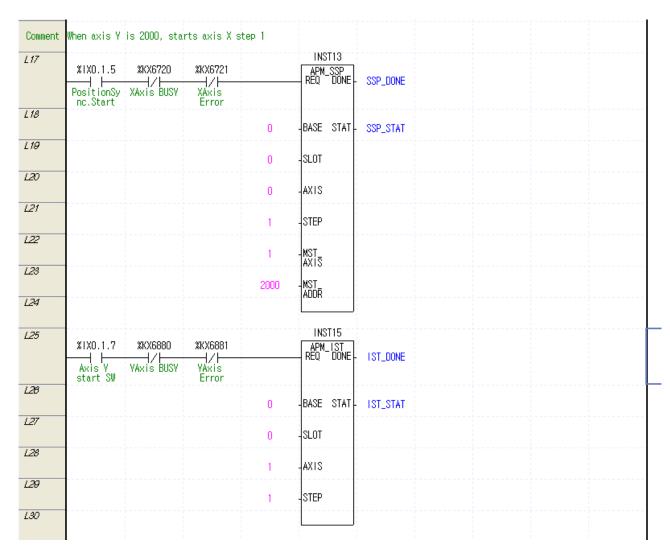
• The program example of position synchronous start is as follows.

(1) XBM/XBC



Device	Description
P0008	axes X and Y error reset, output inhibition cancel switch
P0009	axes X and Y floating origin switch
P000D	Axis X position synchronous switch
P000F	Indirect start switch f axis Y
K4200	Signal during axis X operation
K4201	Error signal of axis X
K4300	Signal during axis Y operation
K4301	Axis Y error signal

(2) XEC Comment When error occurs, resets error and cancels ouptut inhibition INST8 L1 %IX0.1.0 %KX6721 APM_RST REQ DONE X_RST_DONE ⊢ XAxis Error INST7 12 %KX6881 APM_RST REQ DONE Y_RST_DONE 0 BASE STAT X_RST_STAT ⊢ | YAxis Error LЗ BASE STAT V_RST_STAT 0 SLOT *L4* 0 SLOT 0 AXIS L5 AXIS LΒ INH_ OFF *L7* L8 Comment Sets axis X, Y floating origin INST10 L10 %IXO.1.1 %KX6720 %KX6721 APM_FLT REQ DONE X_FLT_DONE ⊢/⊢ XAxis Error INST11 Lff %KX6880 %KX6881 APM_FLT REQ DONE -⊢/⊢ YAxis Error Y_FLT_DONE BASE STAT X_FLT_STAT 0 VAxis BUSY L12 SLOT BASE STAT 0 Y_FLT_STAT 0 L13 SLOT 0 AXIS L14 AXIS L15



Device	Description
%IX0.1.0	axes X and Y error reset, output inhibition cancel switch
%IX0.1.1	axes X and Y floating origin switch
%IX0.1.5	Axis X position synchronous switch
%IX0.1.7	Indirect start switch f axis Y
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X
%KX6880	Signal during axis Y operation
%KX6881	Axis Y error signal

(3) Operation Data Setting

Axis	Step No.	coordinat es	Control pattern	Operation pattern	Operation type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time
Χ	1	Absolu te	Position control	End	Single	0	10,000	0	1	1000	100
Υ	1	Absolu te	Position control	End	Single	0	20,000	0	1	2000	100

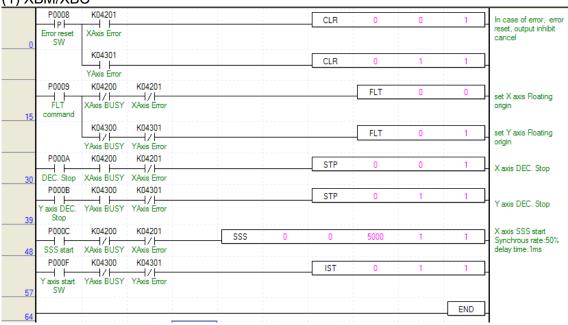
(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On: set as the floating origin at the current position.
- •P000D/%IX0.1.5 (synchronous start) switch On : axis X tarts position synchronous start with axis Y being the main axis.
- •P000F/%IX0.1.7 (Axis Y start) switch On: axis Y starts the step operation. If the position of axis Y reaches 2,000, axis X is synchronized to this, starting step 1.

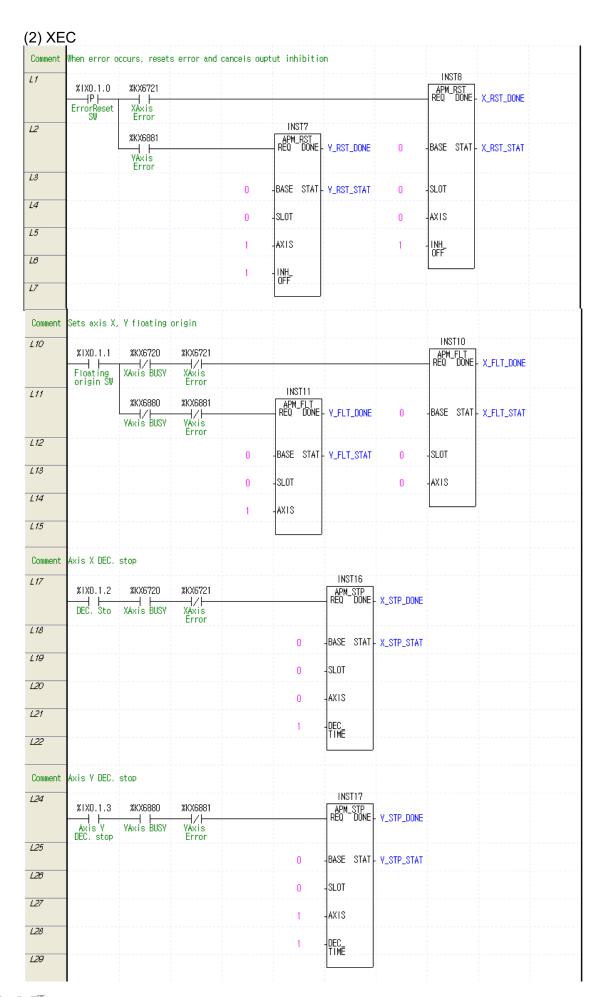
7.2.8 Speed Synchronous Start

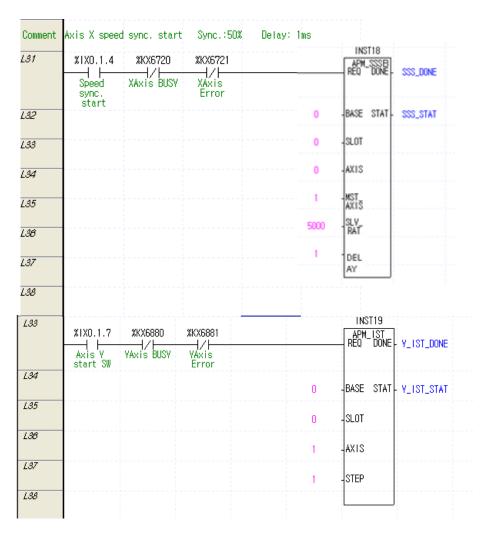
• The program example of speed synchronous start is as follows.

(1) XBM/XBC



a) Devices Used						
Device	Description					
P0008	axes X and Y error reset, output inhibition cancel switch					
P0009	Floating origin switch of axes X and Y					
P000A	axis X deceleration stop switch					
P000B	deceleration stop switch of axis X					
P000C	axis X speed synchronous start switch					
P000F	indirect start switch of axis Y					
K4200	Signal during axis X operation					
K4201	Error signal of axis X					
K4300	Signal during axis Y operation					
K4301	Axis Y error signal					





Device	Description
%IX0.1.0	axes X and Y error reset, output inhibition cancel switch
%IX0.1.1	Floating origin switch of axes X and Y
%IX0.1.2	axis X deceleration stop switch
%IX0.1.3	deceleration stop switch of axis X
%IX0.1.4	axis X speed synchronous start switch
%IX0.1.7	indirect start switch of axis Y
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X
%KX6880	Signal during axis Y operation
%KX6881	Axis Y error signal

(3) Operation Data Setting

-/											
Axis	Step No.	coordina tes	Control pattern	Operatio n pattern	Operatio n type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time
X(auxiliary axis)	1	Absol ute	Position control	End	Single	0	10,000	0	1	1000	100
Y(main axis)	1	Absol ute	Speed control	End	Single	0	15000	0	1	1000	100

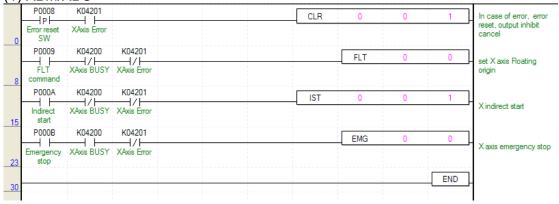
(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000C/%IX0.1.4 (synchronous start) switch On : axis X starts speed synchronous start with axis Y being the main axis.
- •P000F/%IX0.1.7 (Axis Y start) switch On : axis Y starts step 1 operation. Axis X is synchronized to the speed of 50,00% of axis Y and started.

7.2.9 Emergency Stop

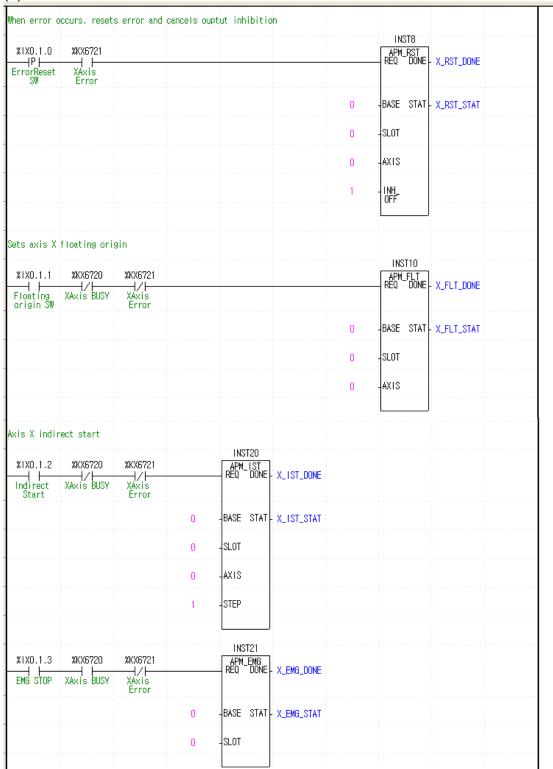
• The program example of emergency stop during operation is as follows.





Device	Description
P0008	Error reset, output inhibition cancel switch in case of emergency stop
P0009	axis X home return switch
P000B	emergency stop switch during home return
K4200	Signal during axis X operation

(2) XEC



Device	Description
%IX0.1.0	Error reset, output inhibition cancel switch in case of emergency stop
%IX0.1.1	axis X home return switch
%IX0.1.7	emergency stop switch during home return
%KX6720	Signal during axis X operation

(3) Operation Data Setting

Step No.	coordinat es	Control pattern	Operation pattern	Operation type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time [ms]
1	Absolut e	Speed control	End	Single	0	10000	0	1	1000	100

(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1 and starts speed control.
- •P000B/%IX0.1.7 (emergency stop) switch On : axis X does emergency stop without deceleration and the output is inhibited.

7.2.10 Jog Operation

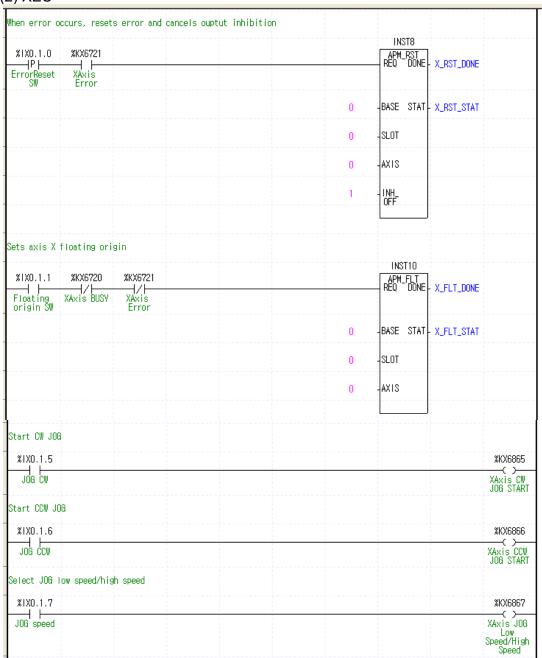
• The program example of jog operation is as follows.





Device	Description						
P0008	Axis X error reset, output inhibition cancel switch						
P0009	axis X floating origin switch						
P000D	axis X jog normal direction start switch						
P000E	axis X jog reverse direction start switch						
P000F	Switch for low/high speed selection of axis X jog						
K4200	Signal during axis X operation						
K4201	Error signal of axis X						

(2) XEC



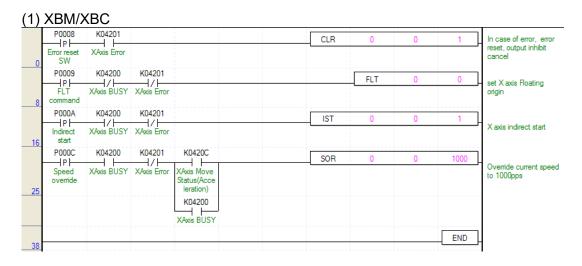
(a) Devices es	, cu
Device	Description
%IX0.1.0	Axis X error reset, output inhibition cancel switch
%IX0.1.1	axis X floating origin switch
%IX0.1.5	axis X jog normal direction start switch
%IX0.1.6	axis X jog reverse direction start switch
%IX0.1.7	Switch for low/high speed selection of axis X jog
%KX6880	Signal during axis X operation
%KX6881	Error signal of axis X

(3) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000D/%IX0.1.5 (jog normal direction) switch On : axis X starts normal direction jog operation.
- •P000F/%IX0.1.7 (jog speed) switch On: axis X is converted to jog high speed.
- •P000D/%IX0.1.5 (jog normal direction) switch Off: axis X does jog stop.
- •P000E/%IX0.1.6 (jog reverse direction) switch On : axis X starts reverse direction jog operation.
- •P000E/%IX0.1.6 (jog reverse direction) switch Off: axis X does jog stop.

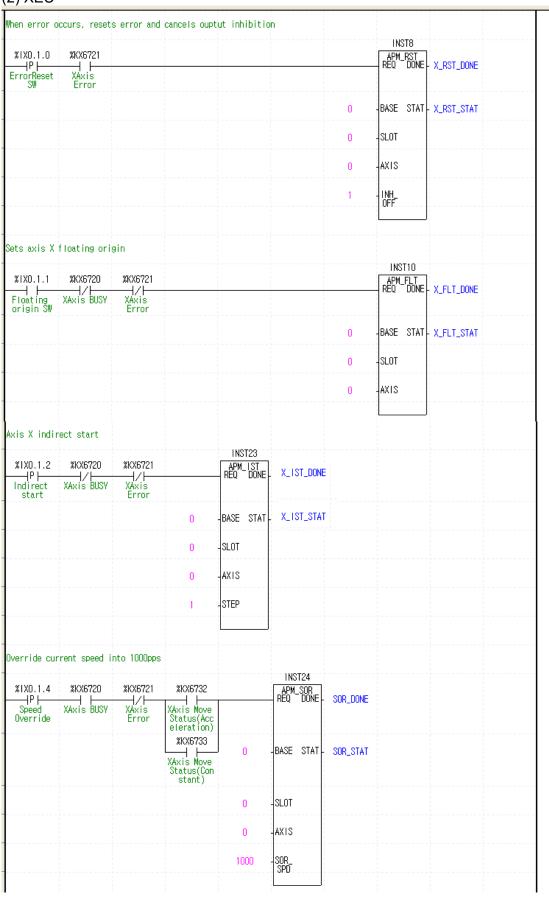
7.2.11 Speed Override

• The program example of speed override during operation is as follows.



Device	Description
P0008	Axis X error reset, output inhibition cancel switch
P0009	axis X floating origin switch
P000A	axis X indirect start switch
P000C	axis X speed override switch
K4200	Signal during axis X operation
K4201	Error signal of axis X
K420C	axis X acceleration signal
K420D	axis X constant speed signal

(2) XEC



Device	Description
%IX0.1.0	Axis X error reset, output inhibition cancel switch
%IX0.1.1	axis X floating origin switch
%IX0.1.2	axis X indirect start switch
%IX0.1.4	axis X speed override switch
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X
%KX6732	axis X acceleration signal
%KX6733	axis X constant speed signal

(3) Operation Data Setting

S	Step No.	coordinat es	Control pattern	Operation pattern	Operation type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time
	1	Absolut e	Position control	End	Single	0	100000	0	1	5000	100

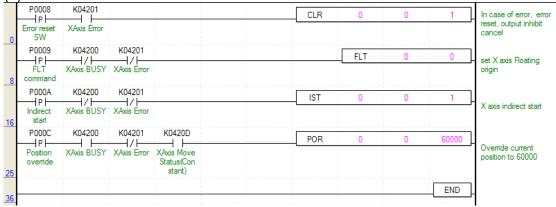
(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1.
- •P000C/%IX0.1.4 (speed override) switch On: overrides the current speed to 1000pps during acceleration or constant speed operation of axis X.

7.2.12 Position Override

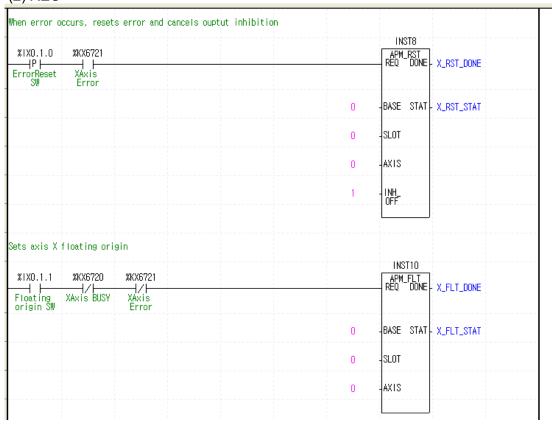
• The program example of position override during operation is as follows.

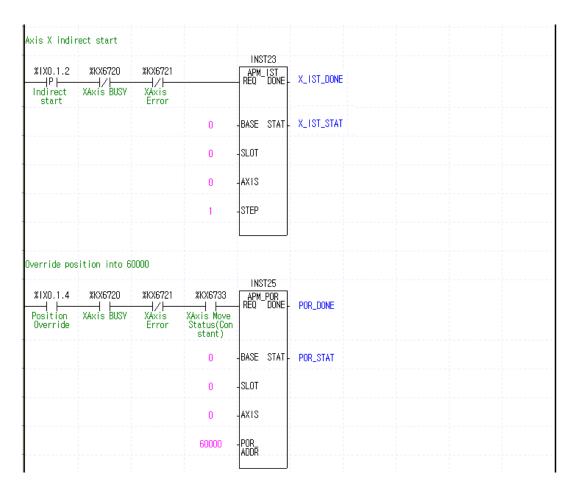
(1) XBM/XBC



Device	Description
P0008	Axis X error reset, output inhibition cancel switch
P0009	axis X floating origin switch
P000A	axis X indirect start switch
P000C	axis X position override switch
K4200	Signal during axis X operation
K4201	Error signal of axis X
K420D	axis X constant speed signal

(2) XEC





Device	Description
%IX0.1.0	Axis X error reset, output inhibition cancel switch
%IX0.1.1	axis X floating origin switch
%IX0.1.2	axis X indirect start switch
%IX0.1.4	axis X position override switch
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X
%KX6733	axis X constant speed signal

(3) Operation Data Setting

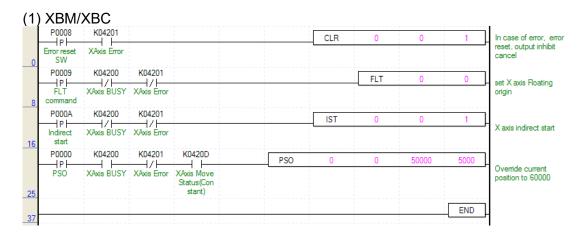
Step No.	coordinat es	Control pattern	Operation pattern	Operation type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time [ms]
1	Absolut e	Position control	End	Single	0	100000	0	1	5000	100

(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1.
- \bullet P000C/%IX0.1.4 (position override) switch On : overrides the current position to 60,000 when the current position is below 60,000.

7.2.13 Speed Override with Position

• The program example of positioning speed override during operation is as follows



a, 2011000 000a					
Device	Description				
P0008	Axis X error reset, output inhibition cancel switch				
P0009	axis X floating origin switch				
P000A	axis X indirect start switch				
P000D	axis X positioning speed override switch				
K4200	200 Signal during axis X operation				
K4201	K4201 Error signal of axis X				
K420D	ř				

(2) XEC When error occurs, resets error and cancels ouptut inhibition INST8 %IXO.1.0 %KX6721 APM_RST REQ DONE X_RST_DONE XAxis Error BASE STAT X_RST_STAT SLOT 0 AXIS 0 Sets axis X floating origin INST10 %IXO.1.1 %KX6720 %KX6721 APM_FLT REQ DONE - X_FLT_DONE Floating XAxis BUSY origin SW ⊢|/|-XAxis Error BASE STAT X_FLT_STAT SLOT 0 0 AXIS Axis X indirect start %IX0.1.2 %KX6720 %KX6721 APM_IST REQ DONE -Indirect start ──//├─ XAxis Error X_IST_DONE XAxis BUSY BASE STAT 0 X_IST_STAT 0 SLOT AXIS STEP Override speed into 5000 when current postion becomes 50000 INST26 %IX0.1.5 %KX6720 %KX6721 %KX6733 APM_PSO REQ DONE XAxis Move Status(Con stant) Speed override with position XAxis Error PSO_DONE XAxis BUSY 0 BASE STAT PS0_STAT SLOT 0 0 AXIS 50000 PSO_ ADDR PSO_ SPD 5000

Device	Description				
%IX0.1.0	Axis X error reset, output inhibition cancel switch				
%IX0.1.1	axis X floating origin switch				
%IX0.1.2	axis X indirect start switch				
%IX0.1.5	axis X positioning speed override switch				
%KX6720	Signal during axis X operation				
%KX6721	Error signal of axis X				
%KX6733	%KX6733 axis X constant speed signal				

(3) Operation Data Setting

Step No.	coordinat es	Control pattern	Operation pattern	Operation type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time
1	Absolut e	Position control	End	Single	0	100000	0	1	10000	100

(4) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On : set as the floating origin at the current position.
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1.
- •P000D/%IX0.1.5 (positioning speed override) switch On: overrides the current speed to 5000 when the current position reaches 50,000.

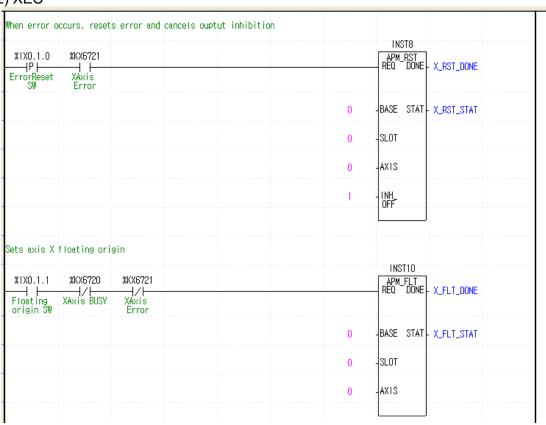
7.2.14 Speed, Position, and Parameter Teaching

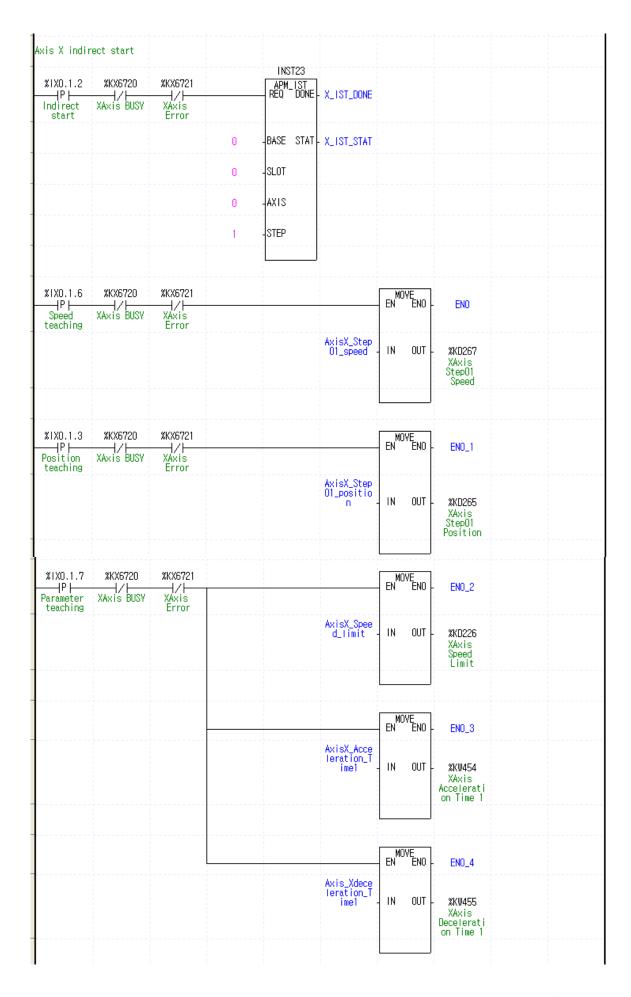
• The program example of teaching of speed, position, and operation parameter is as follows

(1) XBM/XBC P0008 CLR FLT P000/ K04200 ₽ŀ, XAxis BUSY XAxis Error K04201 DMOV D0100 K0534 XAxis Step01 Speed DMOV K0530 D0102 XAxis BUSY XAxis Step01 Position K04200 MOV D0104 K0452 HP H XAxis Error XAxis Speed MOV D0106 K0454 Acceleration Time 1 MOV D0107 K0455 END

1-1/ = - 111111				
Device	Description			
P0008	P0008 Axis X error reset, output inhibition cancel switch			
P0009	axis X home return switch			
P000A	axis X start switch			
P000E	axis X speed teaching switch			
P000B	axis X position teaching switch			
P000F	axis X parameter teaching switch			
K4200	K4200 Signal during axis X operation			
K4201	K4201 Error signal of axis X			
K534 ~ K535	K534 ~ K535 axis X step 1 operation speed			
D0100 ~ D0101	00100 ~ D0101 axis X speed change data (3000)			
K530 ~ K531 axis X step 1 target position				
D0100 ~ D0101	axis X speed change data (5000)			
K452 ~ K453	axis X speed limit			
K454 axis X deceleration time				
K455 axis X acceleration time				
D0100 ~ D0101 axis X speed limit setting data (10000)				
D0102	axis X deceleration time 1 setting data (50)			
D0103	axis X deceleration time 1 setting data (50)			

(2) XEC





(a) Devices osea	
Device	Description
%IX0.1.0	Axis X error reset, output inhibition cancel switch
%IX0.1.1	axis X home return switch
%IX0.1.2	axis X start switch
%IX0.1.6	axis X speed teaching switch
%IX0.1.3	axis X position teaching switch
%IX0.1.7	axis X parameter teaching switch
%KX6720	Signal during axis X operation
%KX6721	Error signal of axis X
%KD267	axis X step 1 operation speed
AxisX_Step01_Speed	axis X speed change data (3000)
%KD265	axis X step 1 target position
AxisX_Step01_Position	axis X speed change data (5000)
%KD266	axis X speed limit
%KW454	axis X acceleration time
%KW455	axis X deceleration time
AxisX_Speed_limit	axis X speed limit setting data (10000)
AxisX_acceleration_time1	axis X acceleration time 1 setting data (50)
AxisX_deceleration_time1	axis X deceleration time 1 setting data (50)

(3) Operation Data Setting

-		J									
	Step No.	coordinates	Control pattern	Operation pattern	Operation type	Repeat step	Target position [pulse]	M code	Acc./Dec. No.	Operation speed [pls/s]	Dwell time
	1	Relative	Position control	End	Repeat	1	10,000	0	1	1000	100

(4) Positioning Basic Parameter Setting

Parameter	Set value
Speed limit	100,000
Acceleration time 1	100
Deceleration time 1	100

(5) Operation Sequence

- •P0009/%IX0.1.1 (floating origin) switch On: set as the floating origin at the current position.
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1.
 - speed : 1,000[pps]
 - target position : 10,000[Pulse]
 - acceleration/deceleration time: 100[ms]
- •P000E/%IX0.1.6 (speed teaching) switch On after positioning is completed: speed of step 1 changes to 3,000[pps].
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1 again.
 - speed : changes to 3,000[pps] and operates.
 - target position : 10,000[Pulse]
 - acceleration/deceleration time: 100[ms]
- P000B/%IX0.1.3 (position teaching) switch On after positioning is completed: the target position of step 1 changes to 5,000.
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1 again.
 - speed : 3,000[pps]
 - target position : changes to 5,000[Pulse] and operates.
 - acceleration/deceleration time: 100[ms]
- P000F/%IX0.1.7 (parameter teaching) switch On after positioning is completed: positioning basic parameter is changed.
- •P000A/%IX0.1.2 (indirect start) switch On: axis X indirectly starts step 1 again.
 - speed : 3,000[pps]
 - target position : 5,000[Pulse]
 - acceleration/deceleration time: changes to 50[ms] and operates.

Remark

- Permanent Storage of Teaching Data
- If you have changed the operation data and parameter by using the DMOV instruction, you need to use the WRT instruction to save the changed value in the flash memory. Otherwise, it is initialized to the value saved in the previous flash memory when the power is off or the mode is changed.

Chapter 8 Troubleshooting Procedure

This chapter describes the errors that occur during the use of XGB PLC and the built-in positioning function, the method of finding the cause of the error, and the actions to take.

8.1 Basic Procedure of Troubleshooting

Although t is important to use a highly reliable device for normal operation of the system, it is important as well how to deal with a trouble quickly.

In case of a trouble, if you want to restart the system, it is critical to find the cause of the trouble and take an action as soon as possible. The basic troubleshooting points you need to keep in mind are as follows.

(1) Check with Naked Eye

Check the following with your naked eye.

- Operation of the machine (in motion, not in motion)
- Power supply whether the rated voltage is normally supplied to XGB PLC
- Condition of the input and output devices
- Distribution (input and output lines, communication cables, expansion)
- Check the Indicators (PWR LED, RUN LED, STOP LED, input and output LED), and access the peripheral devices to check the PLC operation and program contents.

(2) Trouble Check

When you manipulate the device as follows, observe how the trouble develops.

• Turn the operation mode switch to STOP and turn On / Off.

(3) Supposition of the Cause of Trouble

Suppose which of the following the cause of the trouble is.

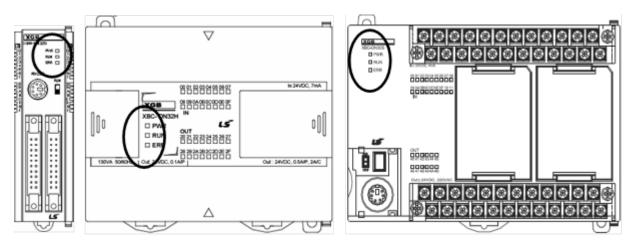
- Whether the cause is in the PLC or an external device
- If the trouble is in the PLC, decide whether it is the trouble of the basic unit or other expansion modules.
- In the former is the case, decide whether there is a problem with the PLC parameter/program or hardware.

8.2 Check by Using the LED

If there is trouble in using the XGB built-in positioning function, you can roughly presume the cause of the trouble by checking the LED of XGB PLC. This chapter describes the LED related to the trouble of the positioning function. With respect to the trouble that occurs during use of other functions of the basic unit, refer to 'Hardware section of the XGB Manual.'

8.2.1 LED Check

If there is trouble during use of the positioning function, check the status of PWR LED, RUN LED and ERR LED of XGB PLC, and check the LED of the input and output contact point related to positioning.



(1) PWR LED Check

Check the PWR LED status and take the following actions.

LED	PLC trouble	Actions to take
On	 Rated voltage is normally supplied to XGB. 	 The power supply is normal, so check whether there is another cause.
Flashing	 One of the following might be the cause. Rated voltage/current set for the XGB is not being supplied. Problem with the PLC hardware Problem with external lines 	 Check the voltage and current of the power supply. Remove the input and output lines, re-supply power and check again. If there still is the same problem, contact the A/S office or customer center.
Off	 Power is not being supplied. Supplied voltage is lower than the rated voltage. The cable is severed. There is a problem with the PLC hardware. 	 Check whether rated voltage is being normally supplied to the PLC. If normally supplied, contact an A/S office or customer center.

(2) RUN LED Check

LED	PLC trouble	Actions to take
On	The program is being normally operated.	Check whether there is another cause.
Off	The running of the program has stopped.	 The program has stopped. Check the ERR LED to find whether it is because of an error or the operation mode is STOP.

(3) ERR LED Check

LED		PLC trouble	Actions to take		
On	A proble	m with the PLC hardware	There is a problem with the PLC hardware, so contact an A/S office or customer center.		
Flashing	Quick flashing (0.1 sec) • Serious trouble that makes operation impossible		Access XGB with XG5000, execute 'Online' -> 'PLC error/warning', check the error and		
	Slow flashing (0.5 sec)	A minor problem with operation continuing	warning, and remove the cause.`		
On	• The prog	gram is being normally run.	The program is being normally run, so check whether there is another problem.		

(4) Positioning Output LED Check

If no problem is found as a result of the check of the LED, check the LED of the output contact point related to the positioning function, and take the following actions.

(a) When the pulse output mode is the PLS/DIR mode

Signal	Contact point	LED status	Error and actions to take
	P20,P21	Fast flashing	 Pulse is being normally output by the positioning function. Check whether there is a problem with the lines of the XGB and motor driver.
Pulse output	(XBM, XBCH) P40,P41 (XBCS) Q00,Q01 (XECH,XECS)	Off	 Pulse is not being normally output. Positioning operation has finished (normal). → Start the next operation instruction. There is an error that makes positioning operation impossible. → Check the positioning error code and remove the cause. For the method of check the error code, refer to Appendix 1.1.

Signal	Contact point	LED status	Output level	Error and actions to take
	P22,P23 (XBM, XBCH) P42,P43		Low Active	Direction signals are being output in the normal direction (normal).
Direction		On	HIGH Active	 Direction signals are being output in the reverse direction (normal). Pulse is not being normally output Positioning operation has finished (normal) → Start the next operation instruction. There is an error that makes positioning operation impossible → Check the positioning error code and remove the cause.
output	(XBCS) Q02,Q03 (XECH,XECS)	Off	Low Active	 Direction signals are being output in the reverse direction (normal) Pulse is not being normally output Positioning operation has finished (normal) → Start the next operation instruction. There is an error that makes positioning operation impossible → Check the positioning error code and remove the cause.
			HIGH Active	Direction signals are being output in the normal direction (normal).

(b) When the pulse output mode is the CW/CCW mode

Signal	CW contact point	CCW contact point	Error and actions to take		
	Flashing	Off	CW pulse is being normally output (normal).		
CW output		Flashing	The pulse is being abnormally output. → Contact an A/S office or customer center.		
	Off	Off	 Pulse is not being output (normal). Positioning operation has finished (normal). → Start the next operation instruction. There is an error that makes positioning operation impossible. → Check the positioning error code and remove the cause 		
		Flashing	CCW pulse is being normally output (normal).		

Remark

• If PWR, RUN, and ERR LED are all off, there is a problem with the internal operation system of XGB. In such a case, XGB PLC cannot normally operate, so inquire of the customer center.

8.3 Check by Error Code

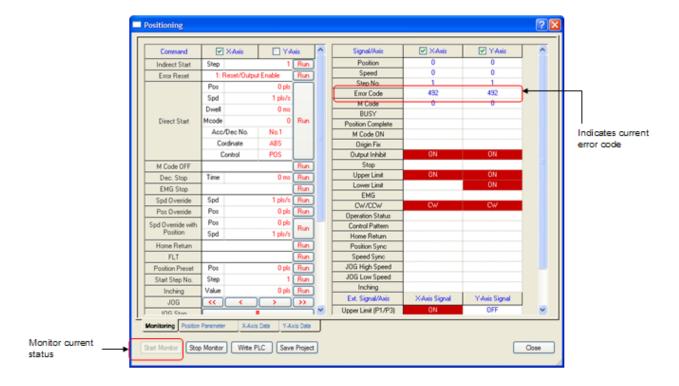
If there is found to be an error as a result of the check of the LED related to positioning, access XGB with XG5000, check the positioning error code, and remove the cause.

This chapter only describes how to check the positioning error codes. With respect to the details of error codes and actions to take, refer to Appendix 1.1.

8.3.1 How to Check Error Codes

The built-in positioning error code can be checked by using the XGB positioning monitoring package or the positioning error code device of area K in the following procedure.

- (1) Positioning Monitoring Package
- (a) Access PLC with XG5000.
- (b) Select 'Monitor' → 'Special Module Monitor' → 'Positioning Module,' the following monitoring package is executed. Select 'Start Monitor' at the left bottom, you can check the error code.



(2) Positioning Area K

- (a) You can check the error code by using the device monitor function of XG5000.
- (b) To check the error code of the XGB positioning function, monitor the following device. About how to use the device monitor, refer to the manual of XG5000.

	Area K address	Data size	
Axis X	K427(%KW427)	Word	
Axis Y	K437(%KW437)	Word	

8.4 Check of Motor Failures

If the motor does not work despite there being no problem after the check according to the procedure described above, check the following.

8.4.1 If the Motor Doesn't Work

- (1) Lines between the XGB and Motor Driver
 - Check whether the lines between XGB and servo motor driver are connected rightly.
 - For the specifications of the input and output of XGB, refer to Chapter 2.
 - For examples of wiring between XGB and the motor driver, refer to Appendix 3.
 - If you use a motor driver that is not addressed in this manual, refer to the manual of that motor driver.
- (2) Setting of the Motor Driver
 - If there is no problem with the wiring, check whether the input pulse of the motor driver is the same as that of the XGB.
 - XGB only supports the open collector type. Check whether the motor driver you are using can accommodate the type, and check the setting of the motor driver.
- (3) Check of the Motor Driver
 - If no problem is found as a result of the procedure above, check whether pulse is actually supplied to the motor driver by using the oscilloscope. If the motor driver isn't working despite the pulse actually being supplied, refer to the manual of the motor driver and check whether there is an error of the driver.

Appendix 1 List of Error Codes

1.1 List of PLC Error Codes

The general error codes that might occur during XGB operation are as follows. To check the error codes, access XGB with XG5000 and execute 'online' → 'PLC error/warning' menu.

Code	Cause	Action to take	Туре	LED status	Detected during
23	There is a problem with the program to run	Re-download and run the project	Minor	0.5 second Flicker	RUN
24	Over I/O parameter	Check the preservation by reading I/O parameter or basic parameter according to the error code type. If there is a	Minor	0.5 second Flicker	Reset RUN mode conversion
25	Over basic parameter	problem, correct it to Write with PLC and check the operation. If the problem still goes on, replace the basic unit.	Minor	0.5 second Flicker	Reset RUN mode conversion
30	The module set in I/O parameter does not match the actually mounted module.	Correct the I/O parameter for it to match the actually mounted module and write with PLC.	Minor	0.5 second Flicker	RUN mode conversion
31	Module is removed or another module is mounted during operation	Turn OFF -> ON.	Serious	0.1 second Flicker	Every scan
33	Data of input and output modules during operation are not normally collected	Replace the module and restart it after checking the input and	Serious	0.1 second Flicker	Scan end
34	Data of special/comm module during operation are not normally collected	output where the error took place by using XG5000.	Serious	0.1 second Flicker	Scan end
38	Number of additionally mounted modules exceeded	No more than 7 layer can be added, remove the excessively added modules and restart.	Serious	0.1 second Flicker	Every scan
39	PLC CPU operation overload or failure due to noise or hardware	I) If repeated when resupply power, call A/S. Carry out noise action.	Serious	0.1 second Flicker	Any time
40	Program scan time during operation exceeds the set scan delay monitoring time	Check the scan delay monitoring time of the basic parameter, and modify it or the program and restart.	Minor	0.5 second Flicker	Program running
41	Operation error during sequence program	Check the step where the operation error took place, remove the cause and restart.	Minor	0.5 second Flicker	Program running
44	Timer index use error	Modify the timer index program, write the program and restart.	Minor	0.5 second Flicker	Scan end
50	Serious failure is detected in external device due to sequence program	Refer to the serious failure detecting error flag of external device, repair it and restart.	Serious	0.1 second Flicker	Scan end
60	E_STOP function performed	Remove the cause of error that started the E-STOP function in the program and re-supply power.	Serious	0.1 second Flicker	Program running
500	Data memory backup error	Re-supply power. (converted to STOP mode in remote mode)	Warning	1 second Flicker	Power On

1.2 List of Positioning Error Codes

Error code that can be occurred in the XGB positioning is as follows.

The user can check error code through XGB dedicated positioning monitoring package or K area (X axis: K427, Y axis: K437). Error code occurs according to dedicated K area applied at starting.

For checking the relationship between positioning parameter and dedicated K area, refer to ch 3.2

	checking the relationship between positioning parameter and dedicated K area, refer to ch.3.2.				
Error code	Description		Countermeasures		
101	Exceeding the max speed range of basic parameter	Stop	Change the max speed value		
102	Exceeding the bias speed of basic parameter 1) bias speed ≥ Speed limit 2) bias speed = 0	Stop	Re-adjust it lower then the max speed of basic parameter.		
103	ACC time setting error 1) ACC time > 10,000 2) Jog ACC time > 10,000	Stop	Re-adjust ACC time of basic parameter lower than 10,000		
104	DEC time setting error 1) DEC time > 10,000 2) Jog DEC time > 10,000	Stop	Re-adjust DEC time of basic parameter lower than 10,000		
105	Setting non use dedicated positioning at parameter	Stop	Setting dedicate positioning.		
111	Expansion parameter soft upper/lower limit error • S/W upper > S/W lower	Stop	Re-adjust S/W upper limit equal to or larger than the lower limit.		
121	Manual operation parameter jog high speed range exceeding error 1) Jog high speed < bias speed 2) Jog high speed >> max speed 3) Jog high speed = 0 4) Jog high speed < Jog low speed	Stop	Re-adjust to be max speed≥jog high speed≥bias speed		
122	Manual operation parameter jog low speed range exceeding error 1) Jog low speed < bias speed 2) Jog low speed > max speed 3) Jog low speed = 0 4) Jog low speed > Jog high speed	Stop	Re-adjust to be jog high speed≥jog low speed≥ 1.		
123	Manual operation parameter inching speed range exceeding error 1) inching speed < bias speed 2) inching speed >> max speed	Stop	Re-adjust to be max speed ≥ inching speed ≥ bias speed		
131	Home return parameter home return mode value range exceeding error	Stop	Re-adjust to be 0 < home return parameter ≤ 3. (1:Dog/origin(On) 2:upper/lower limit/origin 3:DOG)		
132	Home return parameter home return address range exceeding error	Stop	Re-adjust to be S/W upper limit ≥ home return address≥ S/W lower limit		
133	Home return parameter home return high speed range exceeding error 1) home return high speed < bias speed 2) home return high speed > max speed	Stop	Re-adjust to be max speed ≥home return high speed ≥ bias speed		
134	Home return parameter home return low speed range exceeding error 1) home return low speed < bias speed 2) home return low speed > home return high speed	Stop	Re-adjust to be home return high speed ≥home return low speed≥ bias speed		
135	Home return dwell time out error of home return parameter • Home return dwell time > 50,000	Stop	Re-adjust dwell time lower than 50000.		

Error code	Description		Countermeasures		
136	Home return ACC time setting error • Home return ACC time > 10,000	Stop	Re-adjust home return ACC time lower than 10,000		
137	Home return DEC time setting error • Home return DEC time > 10,000		R-adjust home return Dec time lower than 10,000.		
151	Operation speed '0' setting error of operation data	Stop	Set operation speed over '0'.		
152	Operation speed of operation data exceeding the max speed	Stop	Re-adjust to be max speed ≥ operation speed.		
153	Operation speed of operation data set lower than bias speed.	Stop	Re-adjust to be operation speed ≥ bias speed.		
154	Exceeding dwell time setting range of operation data	Stop	Set dwell time lower than 50000.		
155	Exceeding end/continuous/sequential setting range of operation data	Stop	Re-set operation pattern of operation data as one of 0:end 1:continuous or 2:sequential		
201	Home return command is unavailable during operation	Stop	Check whether command axis was not operating at the time of home return command.		
202	Home return command is unavailable in case of 'no output' status.	Stop	Check whether command axis was not in 'no output' status at the time of home return command.		
211	Floating origin setting command is unavailable during operation.	Stop	Check whether command axis was not operating at the time of floating origin setting command.		
221	Direct start command is unavailable during operation.	Stop	Check whether command axis was not operating at the time of direct start command		
222	Direct start command is unavailable in case of 'no output' status.	Stop	Check whether command axis was not in 'no output' status at the time of direct start command.		
223	Direct start command is unavailable in case of M code On	Stop	Check whether M code of command axis was not On at the time of direct start command.		
224	Direct start command is unavailable without origin set in absolute coordinate.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.		
231	Indirect start command is unavailable during operation	Operati on	Check whether command axis was not operating at the time of indirect start command.		
232	Indirect start command is unavailable in case of 'no output' status.	Stop	Check whether command axis was not in 'no output' status at the time of indirect command.		
233	Indirect start command is unavailable in case of M code On.	Stop	Check whether M code signal of command axis was not On at the time of indirect start command.		
234	Indirect start command is unavailable without origin set in absolute coordinate.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.		
236	Continuous operation of indirect start is unavailable in speed control.	Stop	Re-set single or continuous operation if operation data control method is speed		
241	Linear interpolation start is unavailable when main axis of linear interpolation s operating.	Operati on	Check whether main axis was not operating at the time of linear interpolation command.		
242	Linear interpolation start is unavailable when sub axis of linear interpolation is operating.	Operati on	Check whether sub axis was not operating at the time of linear interpolation command.		

Error code	Description	Operation	Countermeasures
244	Linear interpolation start is unavailable when main axis of linear interpolation is in 'Output disabled' status.	Stop	Check whether main axis was not in 'Output disabled' status at the time of linear interpolation command.
245	Linear interpolation start is unavailable when sub axis of linear interpolation is in 'Output disabled' status.	Stop	Check whether a sub axis was not in 'Output disabled' status at the time of linear interpolation command.
247	Linear interpolation start is unavailable when the M code signal of linear interpolation's main axis is On.	Stop	Check whether M code signal of main axis was not On at the time of linear interpolation command.
248	Linear interpolation start is unavailable when M code signal of linear interpolation's sub axis is On.	Stop	Check whether M code signal of sub axis was not On at the time of linear interpolation.
250	Absolute coordinate positioning operation is unavailable when the origin of linear interpolation sub axis is not set.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.
251	Absolute positioning operation is unavailable when the origin of linear interpolation's sub axis is not set.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.
253	Main axis and sub axis of linear interpolation are set incorrectly.	Stop	Re-set the axis date as 3 of linear interpolation command.
257	Linear interpolation is not available when the target position of main axis does not have a target position.	Stop	Check whether the target position of operation data of a step for linear interpolation was not the present status in case of absolute coordinate or set to '0' in case of Incremental coordinate.
258	Linear interpolation is unavailable when main axis is controlling speed.	Stop	Check whether the control method of main axis operation data step for linear interpolation operation was not set by speed control.
259	Linear interpolation is unavailable when sub axis is controlling speed.	Stop	Check whether the control method of sub axis operation data step for linear interpolation was not set by speed control.
291	Concurrent start command is unavailable during operation.	Operatio n	Check whether an axis with error was not contained in concurrent start command and whether there wasn't any operating axis at the time of the command
292	Concurrent start command is unavailable in 'no output' status.	Stop	Check whether an axis with error was not contained in concurrent start command and whether it was not in 'no output' status at the time of the command.
293	Concurrent start command is not available with M code On	Stop	Check whether an axis with error was not contained in concurrent start command and whether M code signal was not On at the time of the command.
294	Concurrent start command is unavailable without origin set	Stop	Concurrent start command with origin set
296	When concurrent start command axis is incorrectly set.	Stop	Re-set the axis date as 3 of concurrent start command
301	Speed/position switching command is unavailable while not operating.	Stop	Check whether an axis did not stop at the time of speed/position switching command.
302	Speed/position switching command is unavailable while not controlling speed.	Stop	Check whether an axis was not in speed control status at the time of speed/position switching command.
304	Speed/position switching command is unavailable without target position.	Stop	Check whether operation had a move(amount) at the time of speed/position switching command.

Error			
code	Description	Operation	Countermeasures
311	Position/speed switching command is unavailable while not	Stop	Check whether an axis did not stop at the time of position/speed
	operating.		switching command.
312	Position/speed switching command is unavailable On a sub	Stop	Check whether an axis was operating as a synchronic operation
	axis of synchronic operation.		sub axis at the time of position/speed switching command.
314	Position/speed switching command is unavailable during	Operation	Check whether an axis was not in linear interpolation operation at
	linear operation.		the time of position/speed switching command.
321	DEC stop command is unavailable while not operating.	Stop	Check whether it was not operating at the time of DEC stop command.
			Check whether it was not jog-operating at the time of DEC stop
322	DEC stop command is not available during jog operation.	Operation	command.
	Position synchronic command is not available during		Check whether an axis was not in operating at the time of position
341	operation	Operation	synchronic command
0.40	Position synchronic command is unavailable in 'no output'	01	Check whether an axis was not in 'no output' status at the time of
342	status.	Stop	position synchronic command.
343	Position synchronic command is unavailable with M code	Stop	Check whether M code signal of an axis was not On at the time of
343	On.	Stop	position synchronic command.
	Position synchronic command is unavailable without origin		Absolute coordinate operation is not available without origin set.
344	set.	Stop	Check whether operation data to operate and the current origin
			set.
346	Position synchronic command is unavailable without origin	Stop	Check whether main axis was without origin set at the time of
	of main axis set.		position synchronic command.
347	There is an error of setting main/sub axis of position synchronic command.	Stop	Check whether main axis of position synchronic command was not set equally with command axis.
	Speed synchronic command is unavailable during		Check whether an axis was not operating at the time of speed
351	operation.	Operation	synchronic command.
	Speed synchronic command is unavailable in 'no output'		Check whether an axis was not in 'no output' status at the time of
352	status.	Stop	speed synchronic command.
252	Chand ayashrania sammand is yasyailahla with Manda On	Cton	Check whether M code signal of an axis was not On at the time of
353	Speed synchronic command is unavailable with M code On	Stop	speed synchronic command.
	There is an error of main/sub axis setting of speed		
355	synchronic command.	Stop	Check whether the main axis of speed synchronic command was
	1) main/ sub axis were set equally		not set equally with command axis.
	2) set of main axis >5		
356	There is an error of synchronization ratio setting of speed	Stop	Check whether the synchronization ratio of speed synchronic
357	synchronic command Delay time setting error	Stop	command was not set between 0~10,000. Check whether delay time was set between 1 ~ 10ms.
331	Position override command is unavailable in any other	σιυμ	Check whether an axis did not stop at the time of position override
361	status but 'busy'	Stop	command.
			Check whether an axis was not dwelling at the time of position
362	Position override command is unavailable during dwelling	Stop	override command.
202	Position override command is unavailable in any other	0	Check whether an axis was not operating by position control at the
363	status but positioning operation.	Operation	time of position override command.
364	Position override command is unavailable for an axis of	Operation	Check whether an axis was not in linear-interpolation operation at
JU4	linear interpolation operation.	Operation	the time of position override command.

Error code	Description	Operation	Countermeasures
366	Position override command is unavailable for a synchronic operation sub axis.	Operation	Check whether an axis was not operating as a sub axis of synchronic operation at the time of position override command.
371	Speed override command is unavailable in any other status but 'busy'.	Stop	Check whether an axis did not stop at the time of speed override command.
372	Out-of speed override range error	Stop	Re-set the speed of speed override command equal to or lower than the max speed set in the basic parameter.
373	Speed override command is unavailable to an sub axis of linear interpolation operation.	Operation	Check whether an axis was not operating as a sub axis of linear interpolation at the time of speed override command.
375	Speed override command is unavailable to an sub axis of synchronic operation	Operation	Check whether an axis was not operating as a sub axis of synchronic operation at the time of speed override command.
377	Speed override command is unavailable in a DEC section	Operation	Check whether an axis was not decelerating for stoppage at the time of speed override command.
381	Positioning speed override command is unavailable in any other status but 'operation'.	Stop	Check whether an axis did not stop at the time of positioning speed override command.
382	Positioning speed override command is unavailable in any other operation but 'positioning operation'	Stop	Check whether an axis was not in speed control operation at the time of positioning speed override.
383	Out of speed override range error of positioning sped override command	Stop	Check whether the speed of positioning speed override command was not equal to or lower than the max speed set in parameter.
384	Positioning speed override command is unavailable to an sub axis of linear interpolation operation.	Operation	Check whether an axis was not operating as a sub axis of linear interpolation at the time of positioning speed override command.
386	Positioning speed override command is unavailable to an sub axis of synchronic operation.	Operation	Check whether an axis was not operating as a sub axis of synchronic operation at the time of positioning speed override command.
401	Inching command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of inching command.
402	Inching command is unavailable in 'no output' status.	Stop	Check whether an axis was not in 'no output' status at the time of inching command.
411	Jog start command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of jog start command.
412	Jog start command is unavailable in 'no output' status.	Stop	Check whether an axis was not in 'no output' status at the time of jog start command.
441	Start step number change/repeat operation start step number designation command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of start step number change command.
442	Start step number change/repeat operation start step number command is unavailable during operation. 1) Step = 0 2) Step > 30(80 for high end)	Stop	Check whether the step number of start step number change command or repeat operation start step number designation command is equal to or higher than 1 and lower and 30(80 for high end) or within the range.
451	Present position preset command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of present position present command.
452	Sub position data may not be set exceeding soft upper/lower limits at the time of present position preset command.	Stop	Check whether the position of present position present command was within the soft upper/lower limits.

Error code	Description	Operation	Countermeasures
481	emergency stop error	Stop	Remove emergency stop causes and clear the error by executing CLR command.
491	External emergency stop error	Stop	Remove emergency stop causes and clear the error with CLR command.
492	Hard upper limit error	Stop	Escape from external upper signal range by using jog command and clear the error with CLR command.
493	Hard lower limit error	Stop	Escape from external upper signal range by using jog command and clear the error with CLR command.
501	Soft upper limit error	Stop	Escape from soft upper limit range by using jog command and clear the error with CLR command.\
502	Soft lower limit error	Stop	Escape from soft lower limit range by using jog command and clear the error with CLR command.
511	Direction turning error during sequential operation	Stop	Check whether the direction are turned during sequential operation.
512	Step number error during indirect start.	Stop	A step over 30 was set in a command. Re-set step number between 1 ~ 30.
513	Address error during indirect start.	Stop	Check whether it repetitively operates a step of which address is '0' during indirection start.
601	PWM command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of present position present command.
602	PWM command is unavailable in 'no output' status	Stop	Check whether an axis was not in 'no output' status at the time of inching command.
603	PWM Output Cycle setting error	Stop	Check whether PWM Output Cycle was set between 1 ~ 20,000.
604	PWM Off duty rate setting error	Operation / Stop	Check whether PWM Off duty rate was set between 1 ~ 100.
605	Speed override command is unavailable during PWM operation	Operation	Check whether an axis was not in PWM operation at the time of speed override command.
606	Position/speed switching command is unavailable during PWM operation	Operation	Check whether an axis was not in PWM operation at the time of position/speed switching command.

Appendix 2 Positioning Instruction and K area List

Appendix 2.1 Positioning instruction list

Instruction used in the XGB positioning is as follows.

For detail, refer to ch.5.2 ~ ch5.3

(1) In case of XBC/XBM.

(1) 111 1111	e of ABO/ABIVI.		
Instructi	Description	Conditions	Remark
ORG	Home starting	Slot, command axis	5.2.1
FLT	Float origin setting	Slot, command axis	5.2.2
DST	Direct starting	Slot, command axis, position, speed, dwell time, M code, control word	5.2.3
IST	Indirect starting	Slot, command axis, step no.	5.2.4
LIN	Linear interpolation starting	Slot, command axis, step no., axis information	5.2.5
SST	Simultaneous starting	Slot, command axis, X step, Y step, Z step, axis information	5.2.6
VTP	Speed/position change	Slot, command axis	5.2.7
PTV	position/speed change	Slot, command axis	5.2.8
STP	Stop	Slot, command axis, DEC. time	5.2.9
SSP	Position synchronization	Slot, command axis, step no., main axis position, main axis setting	5.2.10
SSS	Speed synchronization	Slot, command axis, synchronization rate, delay time	5.2.11
POR	Position override	Slot, command axis, position	5.2.12
SOR	Speed override	Slot, command axis, speed	5.2.13
PSO	Speed override with position	Slot, command axis, position, speed	5.2.14
INCH	Inching starting	Slot, command axis, inching amount	5.2.15
SNS	starting step no. change	Slot, command axis, step no.	5.2.16
MOF	M code cancel	Slot, command axis	5.2.17
PRS	Current position preset	Slot, command axis, position	5.2.18
EMG	EMG stop	Slot, command axis	5.2.19
CLR	Error reset, output inhabit cancel	Slot, command axis, pulse output inhabit/allowed	5.2.20
WRT	Parameter/operation data saving	Slot, command axis, storage area selection	5.2.21
PWM	Pulse width modulation	Slot, instruction axis, output cycle, off duty rate	5.2.22

Remark

• XGB positioning instructions are activated at the rising edge. That is, when the execution contact point is On, it carried out the instruction only once. (PWM insturction is activated at the "On" level).

(2) In case of XEC

(2) In case of X		0 111	Б
Function Block	Description	Conditions	Remark
APM_ORG	Start return to the origin	Req, Base, Slot, Axis	5.3.2
APM_FLT	Set floating origin	Req, Base, Slot, Axis	5.3.3
APM_DST	Direct starting	Req, Base, Slot, Axis, Position, speed, dwell time, M code, position/speed, absolute/incremental, ACC/DEC time	5.3.4
APM_IST	Indirect starting	Req, Base, Slot, Axis, step number	5.3.5
APM_LIN	Linear interpolation starting	Req, Base, Slot, Axis, step number	5.3.6
APM_SST	Simultaneous starting	Req, Base, Slot, Axis, X axis step, Y axis step, Z axis step	5.3.7
APM_VTP	Speed/position switching	Req, Base, Slot, Axis	5.3.8
APM_PTV	Position/speed switching	Req, Base, Slot, Axis	5.3.9
APM_STP	Stop	Req, Base, Slot, Axis, ACC/DEC time	5.3.10
APM_SSP	Position synchronization	Req, Base, Slot, Axis, Step number, main axis, Main axis position	5.3.11
APM_SSSB	Speed synchronization	Req, Base, Slot, Axis, main axis, rate of sub-axis, delay time	5.3.12
APM_POR	Position override	Req, Base, Slot, Axis, position	5.3.13
APM_SOR	Speed override	Req, Base, Slot, Axis, speed	5.3.14
APM_PSO	Positioning speed override	Req, Base, Slot, Axis, position, speed	5.3.15
APM_INC	Inching starting	Req, Base, Slot, Axis, inching amount	5.3.16
APM_SNS	Change starting step number	Req, Base, Slot, Axis, step number	5.3.17
APM_MOF	Cancel M code	Req, Base, Slot, Axis	5.3.18
APM_PRS	Preset current position	Req, Base, Slot, Axis, position	5.3.19
APM_EMG	Emergency stop	Req, Base, Slot	5.3.20
APM_RST	Reset error, cancel output inhibition	Req, Base, Slot, Axis, Enable/Disable pulse output	5.3.21
APM_WRT	Save parameter/operation data	Req, Base, Slot, Axis, Select area to save	5.3.22
APM_PWM	Pulse width modulation	Reg, Slot, Axis, output cycle, off duty rate	5.3.23

Appendix 2.2 Positioning Dedicated K area List

Appendix 2.2.1 K area of positioning basic parameter

				K are			
Item	Setting range	Initial value	Type	posit	Data size		
				X axis	Y axis		
D ::: :	0 N 1 1		XBM/XBC	K4870	K5270	1.4	
Positioning	0 : Not use, 1 : use	0	XEC	%KX7792	%KX8432	bit	
Dula a sutant land	0 : Low Active,	0	XBM/XBC	K4871	K5271	L.14	
Pulse output level	1 : High Active	0	XEC	%KX7793	%KX8433	bit	
Pulse output mode	0 : CW/CCW, 1 : PLS/DIR	0	XBM/XBC	K4873	K5273	Bit	
1 dise output mode	0. CW/CCW, 1.1 L3/Bill	U	XEC	%KX7795	%KX8435	Dit	
M Code Output	0 : NONE, 1 : WITH	0	XBM/XBC	K4681 K4682	K5081 K5082	2bit	
Mode	2 : AFTER	J G	XEC	%KX7489 %KX7490	%KX8129 %KX8130	ZDIT	
D: 1	4 400 000[mula a/a]		XBM/XBC	K450	K490		
Bias speed	1 ~ 100,000[pulse/s]	1	XEC	%KD225	%KD245	Double word	
	4 400 0001 1 / 1		XBM/XBC	K452	K492		
Speed limit	1 ~ 100,000[pulse/s]	100,000	XEC	%KD226	%KD246	Double word	
A00 N 4	0 40 0001 11 1	500	XBM/XBC	K454	K494	\A/ I	
ACC No.1	0 ~ 10,000[unit: ms]	500	XEC	%KW454	%KW494	Word	
DEC No.1	0 40 0005 it1	500	XBM/XBC	K455	K495	Word	
	0 ~ 10,000[unit: ms]		XEC	%KW455	%KW495		
ACC No.2	0 ~ 10,000[unit: ms]	1,000	XBM/XBC	K456	K496		
			XEC	%KW456	%KW496	Word	
DEC No.2	0 ~ 10,000[unit: ms]	1,000	XBM/XBC	K457	K497	10/	
			XEC	%KW457	%KW497	Word	
			XBM/XBC	K458	K498		
ACC No.3	0 ~ 10,000[unit: ms]	1,500	XEC	%KW458	%KW498	Word	
DEC No.3			XBM/XBC	K459	K499		
	0 ~ 10,000[unit: ms]	1,500	XEC	%KW459	%KW499	Word	
ACC No.4			XBM/XBC	K460	K500		
	0 ~ 10,000[unit: ms]	2,000	XEC	%KW460	%KW500	Word	
DEC No.5			XBM/XBC	K461	K501		
	0 ~ 10,000[unit: ms]	2,000	XEC	%KW461	%KW501	Word	
	-2,147,483,648 ~		XBM/XBC	K462	K502		
S/W Upper Limit	2,147,483,647 [pulse]	2,147,483,647	XEC	%KD231	%KD251	Double word	
	-2,147,483,648 ~	-	XBM/XBC	K464	K504		
S/W Lower Limit	2,147,483,647 [pulse]	2,147,483,648	XEC	%KD232	%KD252	Double word	
Backlash			XBM/XBC	K466	K506		
Compensation	0 ~ 65,535[pulse]	0	XEC	%KW466	%KW506	Word	
CAM Limit Data at	O. No Detect 4 - Detect		XBM/XBC	K4684	K5084	Bit	
S/W Limit Detect	0 : No Detect, 1 : Detect	0	XEC	%KX7492	%KX8132		
11	0 - N - D - 4 - 4 - 5 - 4		XBM/XBC	K4872	K5272	D:4	
Upper/Lower limit	0 : No Detect, 1 : Detect	1	XEC	%KX7794	%KX8434	Bit	

Appendix 2.2.2 K area of positioning home parameter

Item	Setting range	Initial	Туре	Dedicated K area		Data size	
Kom	Johnning rungo	value	1,700	X axis	Y axis		
Llows Mathad	0.0	0	XBM/XBC	K4780 K4781	K5180 K5181	D:4	
Home Method	0 ~2	0	XEC	%KX7648 %KX7649	%KX8288 %KX8289	Bit	
Home Direction	0.000 1.000	1	XBM/XBC	K4782	K5182	Bit	
Home Direction	0 : CW, 1 : CCW	1	XEC	%KX7650	%KX8290	DIL	
Llama Addraga	-2,147,483,648~2,147,483,647[pulse]		XBM/XBC	K469	K509	Double word	
Home Address	-2,147,465,046 2,147,465,047 [pulse]	0	XEC	%KD234	%KD254	Double word	
Home High Chood	1 ~ 100,000[pulse/s]	E 000	XBM/XBC	K471	K511	Double word	
Home High Speed	1 ~ 100,000[pulse/s]	5,000	XEC	%KD235	%KD255	Double word	
Hama Law Chaad	1 ~ 100,000[pulse/s]	500	XBM/XBC	K473	K513	Double word	
Home Low Speed			XEC	%KD236	%KD256		
Hamain at ACC Times	0 ~ 10,000[unit: ms]	1,000	XBM/XBC	K475	K515	Word	
Homing ACC Time			XEC	%KW475	%KW515		
Haming DEC Time	0 ~ 10,000[unit: ms]	1,000	XBM/XBC	K476	K516	Word	
Homing DEC Time			XEC	%KW476	%KW516		
DWELL Time	0 ~ 50,000[unit: ms]	0	XBM/XBC	K477	K517	Word	
DWELL TIME	0 % 50,000[unit. ms]	U	XEC	%KW477	%KW517	vvoid	
JOG High Speed	1 ~ 100,000[pulse/s]	5,000	XBM/XBC	K479	K519	Double word	
JOG Flight Speed	1 100,000[puise/s]	3,000	XEC	%KD239	%KD259	Double Word	
IOC Law Speed	1 ~ 100,000[pulse/s]	1 000	XBM/XBC	K481	K521	Daubla ward	
JOG Low Speed	1 ** 100,000[pulse/s]	1,000	XEC	%KD240	%KD260	Double word	
IOC ACC Time	0 40 000[it1	4.000	XBM/XBC	K483	K523	10/2 and	
JOG ACC Time	0 ~ 10,000[unit: ms]	1,000	XEC	%KW483	%KW523	Word	
IOC DEC Time	0 - 10 000[unit: mo]	1,000	XBM/XBC	K484	K524	Mord	
JOG DEC Time	0 ~ 10,000[unit: ms]	1,000	XEC	%KW484	%KW524	Word	
Inching Speed	1 ~ 65,535[pulse/s]	100	XBM/XBC	K485	K525	Mord	
Inching Speed	i 00,000[pulae/a]	100	XEC	%KW485	%KW525	Word	

Appendix 2.2.3 Positioning operation data K area

		2.3 Positioning operation data	Initial	Dedicate	ed K area	Data aina
Step	Item	Setting range va		X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K5484	K8484	
	Coord.	0.ABS, 1.INC	ADO	%KX8772	%KX13572	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K5482~83	K8482~83	
	1 attern	0 . LIND, 1 . INELI , 2 . 00111	LIND	%KX8770~71	%KX13570~71	Bit
	Control	0 : POS, 1 : SPD	POS	K5481	K8481	
	Control	0.1 03, 1.31 D	1 03	%KX8769	%KX13569	Bit
	Method 0 : SIN, 1 : REP	0 - CIN 1 - DED	SIN	K5480	K8480	Bit
		SIIV	%KX8768	%KX13568	ыі	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K549	K849	Word
			U	%KW549	%KW849	
1	Address	0.447.400.0400.447.400.047.[m.:la-a]		K540	K840	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	%KD270	%KD420	
	M Codo	0. 05 505	0	K547	K847	Word
	M Code	0 ~ 65,535	U	%KW547	%KW847	
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K5486~87	K8486~87	Bit
				%KX8774~75	%KX13574~75]
	Speed	1 ~ 100 000[pulse/s]	0	K544	K844	Double word
	Opeeu	1 ~ 100,000[pulse/s]	U	%KD272	%KD422	
	Dwell	0 ~ 50,000[unit:ms]	0	K546	K846	Word
	Dweii	Dweii 0 ~ 50,000[unit.⊪5]		%KW546	%KW846	VVOIG

Step	Item Setting range Init		Initial	Dedicat	ed K area	Data size	
Step	iteiii	Setting range	value	X axis	Y axis	Data Size	
	Coord.	0 : ABS, 1 : INC	ABS	K5484	K8484		
	Coold.	U. ABS, T. INC	ADS	%KX8772	%KX13572	Bit	
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K5482~83	K8482~83		
	Fallem	0. END, 1. REEF, 2. CONT	END	%KX8770~71	%KX13570~71	Bit	
	Control	0 : POS, 1 : SPD	POS	K5481	K8481		
	Odnitoi	0.1 00, 1.01 0	1 00	%KX8769	%KX13569	Bit	
	Method	0 : SIN, 1 : REP	SIN	K5480	K8480	Bit	
	Metriod	U. SIN, T. REF	SIN	%KX8768	%KX13568		
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K549	K849	Word	
				%KW549	%KW849		
2	Address	2 147 492 649 - 2 147 492 647 [pulgo]	Address -2,147,483,648~2,147,483,647 [pulse] 0	_	K540	K840	Double word
	[pulse]	-2,147,463,046 -2,147,463,047 [pulse]	0	%KD270	%KD420	Double word	
	M Code	0 ~ 65,535	0	K547	K847	Word	
	W Code	0 * 03,333	U	%KW547	%KW847	vvoid	
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K5486~87	K8486~87	Bit	
				%KX8774~75	%KX13574~75]	
	Speed	1 ~ 100 000[pulso/s]	0	K544	K844	Double word	
	Speed	1 ~ 100,000[pulse/s]	U	%KD272	%KD422		
	Dwell	0 - 50 000[unit-ms]	0	K546	K846)	
	Dwell	0 ~ 50,000[unit:ms]	U	%KW546	%KW846	Word	

Cton	160.00	Item Setting range	Initial	Dedicate	Data sina	
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K5584	K8584	
	Coord.	U.ABS, T. INC	ADO	%KX8932	%KX13732	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K5582~83	K8582~83	
	rallem	U. END, T. REEF, Z. CONT	END	%KX8930~31	%KX13730~31	Bit
	Control	0 : POS, 1 : SPD	POS	K5581	K8581	
	Odnitoi	0.1 00, 1.01 B	1 00	%KX8929	%KX13729	Bit
	Mathad	0 . CIN 4 . DED	SIN	K5580	K8580	Bit
	Method	0 : SIN, 1 : REP	SIN	%KX8928	%KX13728	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K559	K859	Word
			0	%KW559	%KW859	
3	Address	Address [pulse] -2,147,483,648~2,147,483,647 [pulse]	0	K550	K850	Double word
	[pulse]			%KD275	%KD425	
	M Code	0 ~ 65.535	0	K557	K857	Word
	W Code	0 * 00,000	U	%KW557	%KW857	
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K5586~87	K8586~87	Bit
				%KX8934~35	%KX13734~35	
	Speed	1 ~ 100,000[pulse/s]	0	K554	K854	- Double word
	Оресс	1 100,000[puise/s]	0	%KD277	%KD427	
	Dwell	0 ~ 50 000[unit:ms]	0	K556	K856)//ord
	Dweii	~ 50,000[unit:ms]	U	%KW556	%KW856	Word

Ston	Item	Satting range	Initial	Dedicat	Data size	
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K5684	K8684	
	Coord.	U. ADS, T. INC	ADS	%KX9092	%KX13892	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K5682~83	K8682~83	
	1 attern	U. LIND, T. RELLI, Z. CONT	LIND	%KX9090~91	%KX13890~91	Bit
	Control	0 : POS, 1 : SPD	POS	K5681	K8681	
	Control	0.100, 1.010	100	%KX9089	%KX13889	Bit
	Method	0 : SIN, 1 : REP	SIN	K5680	K8680	Bit
	Wicthod	O. Oliv, T. INEI	011	%KX9088	%KX13888	Dit
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K569	K869	Word
				%KW569	%KW869	
4	Address 2 147 483 648 ~ 2 147 483 647 [r	-2,147,483,648~2,147,483,647 [pulse]	0	K560	K860	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [pulse]	0	%KD280	%KD430	
	M Code	0 ~ 65,535	0	K567	K867	Word
	W Oodo	0 00,000		%KW567	%KW867	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K5686~87	K8686~87	Bit
				%KX9094~95	%KX13894~95	
	Chood	1 - 100 000[mulo o/o]	0	K564	K864	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD282	%KD432	Double word
	Dwell	0 ~ 50,000[unit:™s]	0	K566	K866	Word
	DWell	o oo,ooo[unito]	U	%KW566	%KW866	

Ston	Itom	Softing rouge	Initial	Dedicat	ed K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K5784	K8784	
	Coord.	0 : ABS, 1 : INC	ADS	%KX9252	%KX14052	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K5782~83	K8782~83	Bit
		O. LIND, T. KLLI, Z. CONT	LIND	%KX9250~51	%KX14050~51	
	Control	0 : POS, 1 : SPD	POS	K5781	K8781	
	Control	0.103, 1.350	1 03	%KX9249	%KX14049	Bit
	Method	0 : SIN, 1 : REP	SIN	K5780	K8780	- Bit
	Metriod	U. SIN, I. KEP	SIN	%KX9248	%KX14048	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K579	K879	
			U	%KW579	%KW879	Word
5	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K570	K870	Double word
	[pulse]			%KD285	%KD435	
	M Codo	0 - 65 525	0	K577	K877	10/
	M Code	0 ~ 65,535	U	%KW577	%KW877	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K5786~87	K8786~87	Bit
				%KX9254~55	%KX14054~55	
	Spood	1 - 100 000[pulco/o]	0	K574	K874	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD287	%KD437	
	Dwell	0 50 000[::::it:mo]	0	K576	K876	Word
	Dwell	0 ~ 50,000[unit:ms]	U	%KW576	%KW876	

Ston	Item	Setting range	Initial	Dedicate	ed K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K5884	K8884	
	Coord.	U. ABS, T. INC	ADS	%KX9412	%KX14212	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K5882~83	K8882~83	Bit
		U. LIND, T. KELT, Z. CONT	LIND	%KX9410~11	%KX14210~11	
	Control	0 : POS, 1 : SPD	POS	K5881	K8881	
	Control	0.100, 1.010	PU3	%KX9409	%KX14209	Bit
	Method	Method 0 : SIN, 1 : REP SIN	SINI	K5880	K8880	Bit
	Method		%KX9408	%KX14208	Dit	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K589	K889	Word
			U	%KW589	%KW889	
6	Address [pulse] -2,147,483,648~2,147,483,647 [pulse]	2 147 493 649 ~ 2 147 493 647 [pulco]	0	K580	K880	Double word
		U	%KD290	%KD440	Double word	
	M Code	0 05 505	0	K587	K887	Word
	W Code	0 ~ 65,535	U	%KW587	%KW887	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K5886~87	K8886~87	Bit
				%KX9414~15	%KX14214~15	
	Cnood	1 - 100 000[muloo/o]	0	K584	K884	Double word
1	Speed	1 ~ 100,000[pulse/s]	0	%KD292	%KD442	
	Dwell	0 ~ 50,000[unit:ms]	0	K586	K886	- Word
				%KW586	%KW886	

Ston	ltom	Cotting range	Initial	Dedicate	ed K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K5984	K8984	
	Coord.	U. ABS, T. INC	ADS	%KX9572	%KX14372	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K5982~83	K8982~83	
		O. LIND, T. INCLIT, Z. OOM	LIND	%KX9570~71	%KX14370~71	Bit
	Control	0 : POS, 1 : SPD	POS	K5981	K8981	
	Control	0.703, 1.370	F03	%KX9569	%KX14369	Bit
	Method	0 : SIN, 1 : REP	SIN	K5980	K8980	- Bit
		U. SIN, T. KEF	SIN	%KX9568	%KX14368	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K599	K899	
			U	%KW599	%KW899	Word
7	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K590	K890	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [pulse]	Ů	%KD295	%KD445	Double Word
	M Code	0 ~ 65.535	0	K597	K897	Word
	W Oode	0 00,000	Ů	%KW597	%KW897	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K5986~87	K8986~87	Bit
				%KX9574~75	%KX14374~75	
	Spood	1 ~ 100 000[pulco/c]	0	K594	K894	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD297	%KD447	
	Dwell	0 - 50 000[unitumo]	0	K596	K896	Word
	DMell	0 ~ 50,000[unit:ms]	U	%KW596	%KW896	vvolu

Cton	léana	Cottinu nonno	Initial	Dedicate	ed K area	Doto oi-o
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K6084	K9084	
	Coold.	U.ABG, T. INC	ADO	%KX9732	%KX14532	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6082~83	K9082~83	Bit
		O. LIND, T. INELLY, 2. GOINT		%KX9730~31	%KX14530~31	
	Control	0 : POS, 1 : SPD	POS	K6081	K9081	
	Control	1.00	%KX9729	%KX14529	Bit	
	Method	0 - SIN 4 - DED	CINI	K6080	K9080	Bit
	Method 0 : SIN, 1 : REP	U:SIN, I:REP	SIN	%KX9728	%KX14528	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K609	K909	Word
			U	%KW609	%KW909	
8	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K600	K900	Double word
	[pulse]	-2,147,463,046 -2,147,463,047 [pulse]		%KD300	%KD450	
	M Code	0 ~ 65.535	0	K607	K907	Word
	W Code	0 ~ 00,000	U	%KW607	%KW907	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6086~87	K9086~87	Bit
		, , ,		%KX9734~35	%KX14534~35	
	Speed	1 ~ 100 000[pulse/s]	0	K604	K904	- Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD302	%KD452	
	Durall	0 50 0000 with mol	0	K606	K906	\\/ord
	Dwell	0 ~ 50,000[unit:ms]	0	%KW606	%KW906	Word

Ston	Itom	Setting range	Initial	Dedicate	ed K area	Doto oizo
Step	ltem	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K6184	K9184	
	Coord.	U.ABS, T. INC	ADO	%KX9892	%KX14692	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6182~83	K9182~83]
	1 attern	O. LIND, T. INELLI, Z. COINT	LIND	%KX9890~91	%KX14690~91	Bit
	Control	0 : POS, 1 : SPD	POS	K6181	K9181	
	Control	31. 32, 3. 2	%KX9889	%KX14689	Bit	
	Method	0 : SIN, 1 : REP	SIN	K6180	K9180	- Bit
		O. OIIV, T. IXEI	Ollv	%KX9888	%KX14688	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K619	K919	
0			0	%KW619	%KW919	Word
9	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K610	K910	Double word
	[pulse]	2,111,100,010 2,111,100,011 [paico]		%KD305	%KD455	
	M Code	0 ~ 65,535	0	K617	K917	Word
	W Codo	0 00,000		%KW617	%KW917	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6186~87	K9186~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.5, 5.110.4	U	%KX9894~95	%KX14694~95	Dit
	Chood	1 - 100 000[mulao/a]		K614	K914	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD307	%KD457	
				K616	K916	
	Dwell	0 ~ 50,000[unit: ^{ms}]	0	%KW616	%KW916	Word

Step	Item	Softing range	Initial	Dedicate	d K area	Doto oizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 . ADC 4 . INC	ABS	K6284	K9284	
	Coord.	0 : ABS, 1 : INC	ADS	%KX10052	%KX14852	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6282~83	K9282~83	
	rallem	U. END, T. REEF, Z. GONT	END	%KX10050~51	%KX14850~51	Bit
	Control	0 : POS, 1 : SPD	POS	K6281	K9281	
	Control	0.703, 1.370	F03	%KX10049	%KX14849	Bit
	Method	0 : SIN, 1 : REP	SIN	K6280	K9280	- Bit
	Metriod	U. SIN, T. INEI	SIN	%KX10048	%KX14848	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K629	K929	Word
			U	%KW629	%KW929	
10	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K620	K920	Double word
	[pulse]	-2,147,465,046 -2,147,465,047 [pulse]		%KD310	%KD460	Double Word
	M Code	0 ~ 65,535	0	K627	K927	Word
	W Code	0 00,000	Ů	%KW627	%KW927	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6286~87	K9286~87	Bit
				%KX10054~55	%KX14854~55	
	Speed	$1 \sim 100.000$ [pulse/s]	0	K624	K924	- Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD312	%KD462	
	Dwell	0 ~ 50,000[unit:ms]	0	K626	K926	Word
	DWell		U	%KW626	%KW926	vvolu

Cton	lt avea	Cotting yours	Initial	Dedicate	d K area	Doto oi-o
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K6384	K9384	
	00014.	U.ABO, T. IIVO	ADO	%KX10212	%KX15012	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6382~83	K9382~83	,
	i attem	U. LIND, T. INELT, Z. GOINT	LIND	%KX10210~11	%KX15010~11	Bit
	Control	0 : POS, 1 : SPD	POS	K6381	K9381	
	Control	0.1 00, 1.01 D	1 00	%KX10209	%KX15009	Bit
	Method	0 : SIN, 1 : REP	SIN	K6380	K9380	Bit
	Method	U. SIN, T. KEF	SIIN	%KX10208	%KX15008	
	DED Sten	$0 \sim 30 \ (0 \sim 80 \text{ for high} - \text{end})$	_	K639	K939	Word
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	%KW639	%KW939	
11	Address	2 147 492 649 a 2 147 492 647 [pulgo]	7,483,647 [pulse] 0	K630	K930	Double
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]		%KD315	%KD465	word
	M Code	0 ~ 65.535	0	K637	K937)
	W Code	0~05,535	U	%KW637	%KW937	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6386~87	K9386~87	Bit
		, , , , , , , , , , , , , , , , , , , ,		%KX10214~15	%KX15014~15	
	0	4 400 000[-1	0	K634	K934	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD317	%KD467	
				K636	K936	1
	Dwell	0 ~ 50,000[unit:™S]	0	%KW636	%KW936	Word

Step	Item	Setting range	Initial	Dedicate	d K area	Data size
Step	iteiii	Setting range	value	X axis	Y axis	Data Size
	Coord.	O · ARS 1 · INC	ABS	K6484	K9484	
	Coold.	0 : ABS, 1 : INC	ADS	%KX10372	%KX15172	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6482~83	K9482~83	
		0. END, 1. REEF, 2. CONT	END	%KX10370~71	%KX15170~71	Bit
	Control	0 : POS, 1 : SPD	POS	K6481	K9481	
	Control	0.703, 1.370	F03	%KX10369	%KX15169	Bit
	Method	0 : SIN, 1 : REP	SIN	K6480	K9480	Bit
		U.SIN, I.REP	SIIV	%KX10368	%KX15168	DIL
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K649	K949	Word
			U	%KW649	%KW949	
12	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K640	K940	Double word
	[pulse]			%KD320	%KD470	
		0. 05 505	_	K647	K947	Word
	M Code	0 ~ 65,535	0	%KW647	%KW947	
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6486~87	K9486~87	Bit
				%KX10374~75	%KX15174~75	
	Spood	1 - 100 000[puloo/o]	0	K644	K944	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD322	%KD472	
		0 ~ 50,000[unit:ms]		K646	K946	Mord
	Dwell		0	%KW646	%KW946	Word

Cton	lto	Setting yours	Initial	Dedicate	ed K area	Doto oi-o
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K6584	K9584	
	Coord.	0 . ABS, 1 . INC	ADS	%KX10532	%KX15332	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6582~83	K9582~83	Bit
	1 attern	O . END, T . REET , Z . CONT	LIND	%KX10530~31	%KX15330~31	
	Control	0 : POS, 1 : SPD	POS	K6581	K9581	Bit
		0.703, 1.370	F03	%KX10529	%KX15329	
	Method	0 : SIN, 1 : REP	CINI	K6580	K9580	Bit
		U. SIN, T. REP	SIN	%KX10528	%KX15328	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)		K659	K959	
			0	%KW659	%KW959	Word
13	Address	I-2.147.483.648~2.147.483.647 [pulse]	0	K650	K950	Double word
	[pulse]			%KD325	%KD475	
	M Code	0 ~ 65.535	0	K657	K957	Word
	W Code	0 - 05,555	U	%KW657	%KW957	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6586~87	K9586~87	Bit
				%KX10534~35	%KX15334~35	
	Chood	1 - 100 000[mulac/c]	0	K654	K954	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD327	%KD477	
				K656	K956	\A/l
	Dwell	0 ~ 50,000[unit:ms]	0	%KW656	%KW956	Word

Step	ltom	Softing rouge	Initial	Dedicate	d K area	Data size
Step	Item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K6684	K9684	
	00014.	U. ABS, T. INC	ADS	%KX10692	%KX15492	Bit
	Detterm	0 : END, 1 : KEEP, 2 : CONT	END	K6682~83	K9682~83	
	Pattern	U. END, T. REEF, Z. CONT	END	%KX10690~91	%KX15490~91	Bit
	Comtral	0 · DOS 1 · SDD	DOG	K6681	K9681	
	Control	0 : POS, 1 : SPD	POS	%KX10689	%KX15489	Bit
	Method	0 : SIN, 1 : REP	CIN	K6680	K9680	- Bit
		U. SIN, T. REF	SIN	%KX10688	%KX15488	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K669	K969	Word
14			U	%KW669	%KW969	
14	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K660	K960	Double word
	[pulse]	-2,147,465,046 -2,147,465,047 [pulse]		%KD330	%KD480	
	M Code	0 ~ 65,535	0	K667	K967	Word
	W Code	0 ~ 00,000	U	%KW667	%KW967	vvolu
	A /D N -	0 - N - 4 4 - N - 0 0 - N - 0 0 - N - 4		K6686~87	K9686~87	D:4
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	%KX10694~95	%KX15494~95	Bit
	Canad	1 - 100 000[nuloo/o]	0	K664	K964	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD332	%KD482	
	5 "			K666	K966	, , , ,
	Dwell	0 ~ 50,000[unit: ^{ms}]	0	%KW666	%KW966	Word

Ston	ltom	Softing rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K6784	K9784	
	Coord.	U.ABS, T. INC	ADO	%KX10852	%KX15652	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6782~83	K9782~83	
	1 attorn	O. LIND, T. INLLIT, 2. COINT	LIND	%KX10850~51	%KX15650~51	Bit
	Control	0 : POS, 1 : SPD	POS	K6781	K9781	
	Control	100	%KX10849	%KX15649	Bit	
	Method	0 : SIN, 1 : REP	SIN	K6780	K9780	Bit
		0 . OII4, 1 . IXEI	Onv	%KX10848	%KX15648	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K679	K979	Word
15			U	%KW679	%KW979	
13	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K670	K970	Double word
	[pulse]	2,147,403,040 2,147,403,047 [pulse]	U	%KD335	%KD485	
	M Code	0 65 525	0	K677	K977	Word
	M Code	0 ~ 65,535	U	%KW677	%KW977	vvora
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6786~87	K9786~87	Bit
	A/D NO.	0 . No. 1, 1 . No. 2, 2 . No. 3, 3 . No. 4	U	%KX10854~55	%KX15654~55	DIL
	Spood	1 ~ 100,000[pulse/s]	0	K674	K974	Double word
	Speed	1 100,000[puise/s]	U	%KD337	%KD487	
	Dwell	0 - 50 000[unitumo]	0	K676	K976	Word
	DWell	0 ~ 50,000[unit:™S]		%KW676	%KW976	vvolu

Ston	ltom	Softing rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K6884	K9884	
	Coord.	0 . AB3, 1 . INC	Abs	%KX11012	%KX15812	Bit
	Pattern 0 : END, 1 : KEEP, 2 : CONT END	0 · END 1 · KEED 2 · CONT	END	K6882~83	K9882~83	
		%KX11010~11	%KX15810~11	Bit		
	Control	0 : POS, 1 : SPD	POS	K6881	K9881	
	Control	0.100, 1.010	PU3	%KX11009	%KX15809	Bit
	Method	0 : SIN, 1 : REP	SIN	K6880	K9880	Bit
		U. SIN, T. KEF	SIIV	%KX11008	%KX15808	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K689	K989	Word
16			U	%KW689	%KW989	
10	Address ,	-2,147,483,648~2,147,483,647 [pulse]	0	K680	K980	Double word
	[pulse]	-2,147,403,040 2,147,403,047 [pulse]		%KD340	%KD490	
	M Code	0 ~ 65.535	0	K687	K987	Word
	W Code	0 00,000	Ů	%KW687	%KW987	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6886~87	K9886~87	Dit
	A/D NO.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX11014~15	%KX15814~15	Bit
	Speed	1 ~ 100 000[nulco/c]	0	K684	K984	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD342	%KD492	Double Word
	Durall	0 50 000[;t.mo]		K686	K986	10/a md
	Dwell	0 ~ 50,000[unit:ms]	0	%KW686	%KW986	Word

Ston	Item	Softing rongo	Initial	Dedicate	d K area	Doto cizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K6984	K9984	
	Coord.	U.ABO, T. INC	ADO	%KX11172	%KX15972	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K6982~83	K9982~83	Bit
		O. END, T. NEEL, Z. OOM	LIND	%KX11170~71	%KX15970~71	
	Control	0 : POS, 1 : SPD	POS	K6981	K9981	
	Control	0.1 00, 1.01 0	1 00	%KX11169	%KX15969	Bit
	Method	0 : SIN, 1 : REP	SIN	K6980	K9980	Bit
		O. Oliv, T. INEL	Oliv	%KX11168	%KX15968	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K699	K999	Word
17	TIET OTOP			%KW699	%KW999	
17	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K690	K990	Double word
	[pulse]	2,147,400,040 2,147,400,047 [puise]	U	%KD345	%KD495	
	M Code	0 ~ 65,535	0	K697	K997	Word
	W Code	0 ~ 65,555	U	%KW697	%KW997	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K6986~87	K9986~87	Bit
	A/D No.	0 . NO.1, 1 . NO.2, 2 . NO.3, 3 . NO.4	U	%KX11174~75	%KX15974~75	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K694	K994	Double word
	Ореец	1 100,000[pui36/3]	U	%KD347	%KD497	
	Dwell	0 ~ 50,000[unit:ms]	0	K696	K996	Word
	DWell	0 30,000[unit]		%KW696	%KW996	vvolu

Step	Item	Sotting range	Initial	Dedicate	d K area	Doto oizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K7084	K10084	
	Coord.	U.ABS, T.ING	ADO	%KX11332	%KX16132	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7082~83	K10082~83	
	1 attern	O . LIND, T . INCLET , 2 . COINT	LIND	%KX11330~31	%KX16130~31	Bit
	Control	0 : POS, 1 : SPD	POS	K7081	K10081	
	33.113.	1 00	%KX11329	%KX16129	Bit	
	Method	0 : SIN, 1 : REP	SIN	K7080	K10080	- Bit
		U. SIN, T. INEI	Ollv	%KX11328	%KX16128	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K709	K1009	Word
18			U U	%KW709	%KW1009	
10	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K700	K1000	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [puise]	0	%KD350	%KD500	
	M Code	0 ~ 65,535	0	K707	K1007	Word
	W Code	0 00,000	0	%KW707	%KW1007	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K7086~87	K10086~87	Dit
	A/D No.	0 . No. 1, 1 . No. 2, 2 . No. 3, 3 . No. 4	U	%KX11334~35	%KX16134~35	Bit
	Speed	1 ~ 100 000[pulso/s]	0	K704	K1004	Double word
	Opeeu	1 ~ 100,000[pulse/s]	0	%KD352	%KD502	
	Durall	0 50 000[it.mo]	0	K706	K1006	Word
	Dwell	0 ~ 50,000[unit:ms]	U	%KW706	%KW1006	vvoid

Ston	Item	Setting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	O · ARS 1 · INC	ABS	K7184	K10184	
	Coord.	0 : ABS, 1 : INC	ADS	%KX11492	%KX16292	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7182~83	K10182~83	
	1 attern	U. LIND, T. RELL, Z. CONT	LIND	%KX11490~91	%KX16290~91	Bit
	Control	0 : POS, 1 : SPD	POS	K7181	K10181	
	33/143/ 0.1.3/3	1 03	%KX11489	%KX16289	Bit	
	Method	0 : SIN, 1 : REP	SIN	K7180	K10180	- Bit
	Wictiod	O. Oliv, T. INCI	Ollv	%KX11488	%KX16288	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K719	K1019	Word
19	INEI OICP	0 30 (0 00 for high - cha)		%KW719	%KW1019	
15	Address	-2.147,483,648~2,147,483,647 [pulse]	0	K710	K1010	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [puise]	U	%KD355	%KD505	
	M Code	0 ~ 65,535	0	K717	K1017	Word
	W Code	0 00,000	U	%KW717	%KW1017	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K7186~87	K10186~87	Bit
	A/D No.	0 . 140.1, 1 . 140.2, 2 . 140.3, 0 . 140.4	U	%KX11494~95	%KX16294~95	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K714	K1014	Double word
	Speed	1 100,000[pui3c/3]		%KD357	%KD507	
	Dwell	0 ~ 50,000[unit: ^{ms}]	0	K716	K1016	Word
	DWell	0 30,000[uiiit.iii0]	U	%KW716	%KW1016	vvolu

Ston	Item	Softing range	Initial	Dedicate	d K area	Doto cizo
Step	iteiii	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K7284	K10284	
	Occiu.	U. ABO, T. INC	ADO	%KX11652	%KX16452	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7282~83	K10282~83	D.;
	1 attorn	O. LIND, T. INCLIT, Z. OOM	LIND	%KX11650~51	%KX16450~51	Bit
	Control	0 : POS, 1 : SPD	POS	K7281	K10281	D.;
	0.1.00, 1.0.0	F03	%KX11649	%KX16449	Bit	
	Method	0 : SIN, 1 : REP	SIN	K7280	K10280	- Bit
		O. OIN, T. IXLI	Ollv	%KX11648	%KX16448	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K729	K1029	Word
20	TALL OLEP		U	%KW729	%KW1029	
20	Address	ddress -2,147,483,648~2,147,483,647 [pulse]	0	K720	K1020	Double word
	[pulse]	-2,147,403,040 2,147,403,047 [pulse]	U	%KD360	%KD510	
	M Code	0 ~ 65,535	0	K727	K1027	Word
	W Code	0 ~ 05,555	U	%KW727	%KW1027	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K7286~87	K10286~87	Bit
	A/D No.	0 . 110.1, 1 . 110.2, 2 . 110.3, 3 . 110.4	U	%KX11654~55	%KX16454~55	Dit
	Spood	1 ~ 100 000[nulco/c]	0	K724	K1024	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD362	%KD512	
	Dwell	0 ~ 50,000[unit:ms]	0	K726	K1026	Word
	DMell	0 30,000[utilt.mo]	U	%KW726	%KW1026	vvoid

Ston	Itom	Softing rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K7384	K10384	
	Coord.	0 . ABO, 1 . INC	ADO	%KX11812	%KX16612	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7382~83	K10382~83	
	rallem	U. END, T. REEF, Z. CONT	END	%KX11810~11	%KX16610~11	Bit
	Control	0 : POS, 1 : SPD	POS	K7381	K10381	
	Control	0.100, 1.010	1 03	%KX11809	%KX16609	Bit
	Method	0 : SIN, 1 : REP	SIN	K7380	K10380	Bit
	Metriod	U. SIN, T. KEF	SIN	%KX11808	%KX16608	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K739	K1039	Word
21	ПСТ ОТЕР	0 · 30 (0 · 00 for flight - end)	or riigir - cria)	%KW739	%KW1039	
21	Address	0.447.400.0400.447.400.047.11.	0	K730	K1030	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	%KD365	%KD515	
	M Code	0 ~ 65.535	0	K737	K1037	Word
	W Code	0 ~ 03,333	U	%KW737	%KW1037	vvoiu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K7386~87	K10386~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX11814~15	%KX16614~15	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K734	K1034	Double word
			U	%KD367	%KD517	
	Dwell	0 ~ 50,000[unit:ms]	0	K736	K1036	Word
	DWCII	o oo,ooolumioj		%KW736	%KW1036	VVOIG

Ston	Itom	Softing rouge	Initial	Dedicate	d K area	Doto circ
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K7484	K10484	
	Coord.	U. ABG, T. INC	ADO	%KX11972	%KX16772	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7482~83	K10482~83	
	rattem	U. END, I. REEF, Z. GONI	LIND	%KX11970~71	%KX16770~71	Bit
	Control	0 : POS, 1 : SPD	POS	K7481	K10481	
	Control	0 . FOS, 1 . SFD	F03	%KX11969	%KX16769	Bit
	Method	0 : SIN, 1 : REP	SIN	K7480	K10480	- Bit
	Wethod U. Silv, T. KEF	U. SIN, T. INCI	SIIV	%KX11968	%KX16768	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K749	K1049	Word
22			Ů	%KW749	%KW1049	
22	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K740	K1040	Double word
	[pulse]	-2,147,465,046 -2,147,465,047 [pulse]	U	%KD370	%KD520	
	M Code	0 ~ 65.535	0	K747	K1047	Word
	W Code	0 ~ 65,555	U	%KW747	%KW1047	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K7486~87	K10486~87	Bit
	A/D NO.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX11974~75	%KX16774~75	DIL
	Speed	1 ~ 100 000[pulse/s]	0	K744	K1044	Double word
	Opeeu	1 ~ 100,000[pulse/s]	0	%KD372	%KD522	
	Dwell	0 - 50 000[unitumo]	0	K746	K1046	Word
	DMell	0 ~ 50,000[unit: ms]	U	%KW746	%KW1046	vvoiu

Step	Item	Softing rouge	Initial	Dedicate	d K area	Data size
Step	itein	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K7584	K10584	
	Coord.	U. ABG, T. INC	ADO	%KX12132	%KX16932	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7582~83	K10582~83	
	1 attern	U. LIND, T. INELT, 2. CONT	LIND	%KX12130~31	%KX16930~31	Bit
	Control	0 : POS, 1 : SPD	POS	K7581	K10581	
	30.1.3. 3.1.3.B	F03	%KX12129	%KX16929	Bit	
	Method	0 : SIN, 1 : REP	SIN	K7580	K10580	- Bit
	Wethod	U. SIN, T. INEI	SIIV	%KX12128	%KX16928	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K759	K1059	Word
23	KEP Step		U	%KW759	%KW1059	
23	Address	2 4 4 7 4 9 2 6 4 9 . 2 4 4 7 4 9 2 6 4 7 [mula a]	0	K750	K1050	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]		%KD375	%KD525	
	M Codo	0 - 65 525	0	K757	K1057	10/
	M Code	0 ~ 65,535	0	%KW757	%KW1057	Word
	A/D No.	0 · No 1 1 · No 2 2 · No 2 2 · No 4	0	K7586~87	K10586~87	Bit
	A/D NO.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX12134~35	%KX16934~35	DIL
	Spood	1 - 100 000[puloo/o]	0	K754	K1054	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD377	%KD527	
	Dwell	0 ~ 50 000[unit:ms]	0	K756	K1056	Word
	Dweii	0 ~ 50,000[unit:™S]	0	%KW756	%KW1056	vvolu

Ston	Item	Softing range	Initial	Dedicate	ed K area	Doto oizo
Step	iteiii	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K7684	K10684	
	occiu.	U. ABS, T. INC	ADS	%KX12292	%KX17092	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7682~83	K10682~83	
	1 attern	U. LIND, T. RELLI, Z. GOINT	LIND	%KX12290~91	%KX17090~91	Bit
	Control	0 : POS, 1 : SPD	POS	K7681	K10681	
	Control	0.1 00, 1.01 0	1 00	%KX12289	%KX17089	Bit
	Method	0 : SIN, 1 : REP	SIN	K7680	K10680	- Bit
	Wictiou	O. OIN, T. INC.	Ollv	%KX12288	%KX17088	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K769	K1069	Word
24	INEI Olep		0	%KW769	%KW1069	
24	Address	2 447 492 649 - 2 447 492 647 [mulas]	0	K760	K1060	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	U	%KD380	%KD530	
	M Code	0 ~ 65,535	0	K767	K1067	Word
	W Code	0 ~ 00,000	U	%KW767	%KW1067	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K7686~87	K10686~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX12294~95	%KX17094~95	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K764	K1064	Double word
	Орсси	1 100,000[puisc/s]	, o	%KD382	%KD532	Double Word
	Dwell	0 - 50 000(upit·ms]	0	K766	K1066	Word
	DWell	0 ~ 50,000[unit:™S]	U	%KW766	%KW1066	vvolu

Ston	ltom	Setting rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K7784	K10784	
	Coord.	0 . ABS, 1 . INC	ADO	%KX12452	%KX17252	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7782~83	K10782~83	
	1 attern	O. LIND, T. INELLY, 2. CONT	LIND	%KX12450~51	%KX17250~51	Bit
	Control	0 : POS, 1 : SPD	POS	K7781	K10781	
	Control	0.F03, 1.3FD	FU3	%KX12449	%KX17249	Bit
	Method	0 : SIN, 1 : REP	SIN	K7780	K10780	- Bit
		0 . 3IIV, 1 . IVEI	Ollv	%KX12448	%KX17248	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K779	K1079	Word
O.E.	INEI Step	0 - 30 (0 - 60 for flight - end)	U	%KW779	%KW1079	
25	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K770	K1070	Double word
	[pulse]	-2, 147,400,040 2, 147,400,047 [pulse]	U	%KD385	%KD535	
	M Code	0 ~ 65.535	0	K777	K1077	Word
	W Code	0 ~ 05,535	U	%KW777	%KW1077	vvolu
	A/D NI-	0 : N = 4 4 : N = 0 0 : N = 0 0 : N = 4		K7786~87	K10786~87	D:4
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	%KX12454~55	%KX17254~55	Bit
	Spood	1 ~ 100,000[pulse/s]	0	K774	K1074	Double word
	Speed	1 - 100,000[puise/s]	U	%KD387	%KD537	
F	Dwell	0 - 50 000[unit-ms]	0	K776	K1076	Word
	חשפוו	0 ~ 50,000[unit:ms]	U	%KW776	%KW1076	vvolu

Step	Item	Setting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K7884	K10884	
	Coord.	U. ABS, T. INC	ADO	%KX12612	%KX17412	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7882~83	K10882~83	
	1 ditoiii	O. END, T. REET, Z. OOM	LIND	%KX12610~11	%KX17410~11	Bit
	Control	0 : POS, 1 : SPD	POS	K7881	K10881	D.;
	Odnitoi	0.1 00, 1.01 0	1 00	%KX12609	%KX17409	Bit
	Method	0 : SIN, 1 : REP	SIN	K7880	K10880	Bit
		O. SIN, T. INEI	Onv	%KX12608	%KX17408	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K789	K1089	Word
26	TIET OTOP		U	%KW789	%KW1089	
20	Address	-2,147,483,648~2,147,483,647 [pulse]	e] 0	K780	K1080	Double word
	[pulse]	2,117,100,010 2,117,100,017 [paico]		%KD390	%KD540	Boable Word
	M Code	0 ~ 65,535	0	K787	K1087	Word
	oodo	0 00,000		%KW787	%KW1087	
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K7886~87	K10886~87	Bit
	700100.	0.110.1, 1.110.2, 2.110.0, 0.110.4	Ů	%KX12614~15	%KX17414~15	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K784	K1084	Double word
	Speeu	1 100,000[pail30/3]	J	%KD392	%KD542	
	Dwell	0 ~ 50,000[unit:ms]	0	K786	K1086	Word
	DWell			%KW786	%KW1086	

Ston	Item	Sotting rongs	Initial	Dedicate	d K area	Data size
Step	itein	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K7984	K10984	
	Coord.	U.ABS, T. INC	ADO	%KX12772	%KX17572	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K7982~83	K10982~83	
	1 attorn	O. END, T. KEEF, Z. CONT	LIND	%KX12770~71	%KX17570~71	Bit
	Control	0 : POS, 1 : SPD	POS	K7981	K10981	
	Control	0.1 00, 1.01 B	1 00	%KX12769	%KX17569	Bit
	Method	0 : SIN, 1 : REP	SIN	K7980	K10980	Bit
		0.3IN, 1.1KLI	SIN	%KX12768	%KX17568	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K799	K1099	Word
27	IXLI Step	0 - 30 (0 - 60 for high - end)	U	%KW799	%KW1099	
21	Address	2 4 4 7 4 9 2 6 4 9 2 4 4 7 4 9 2 6 4 7 [mulas]	0	K790	K1090	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	U	%KD395	%KD545	
	M Code	0 65 525	0	K797	K1097	Word
	M Code	0 ~ 65,535	U	%KW797	%KW1097	vvora
	A/D No.	0 · No 1 1 · No 2 2 · No 2 2 · No 4	0	K7986~87	K10986~87	Bit
	A/D NO.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	%KX12774~75	%KX17574~75	DIL
	Chood	1 - 100 000[puloo/o]	0	K794	K1094	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD397	%KD547	
	Durall	0 50 000[it.me]	0	K796	K1096	Word
	Dwell	0 ~ 50,000[unit:™S]	0	%KW796	%KW1096	vvora

Ston	ltom	Softing rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	O · ABS 1 · INC	ABS	K8084	K11084	
	Coord.	0 : ABS, 1 : INC	AbS	%KX12932	%KX17732	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K8082~83	K11082~83	
	1 attern	O. LIND, T. INELLY, 2. CONT	LIND	%KX12930~31	%KX17730~31	Bit
	Control	0 : POS, 1 : SPD	POS	K8081	K11081	
	Control	100	%KX12929	%KX17729	Bit	
	Method	0 : SIN, 1 : REP	SIN	K8080	K11080	Bit
		O. Oliv, T. INEI	Ollv	%KX12928	%KX17728	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K809	K1109	Word
28	IXEI Olop	0 30 (0 00 for high - cha)	, o	%KW809	%KW1109	
20	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K800	K1100	Double word
	[pulse]	2,147,400,040 2,147,400,047 [puise]	Ů	%KD400	%KD550	
	M Code	0 ~ 65,535	0	K807	K1107	Word
	W Code	0 00,000	Ů	%KW807	%KW1107	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K8086~87	K11086~87	Bit
	A/D No.	0 . 110.1, 1 . 110.2, 2 . 110.3, 3 . 110.4	U U	%KX12934~35	%KX17734~35	Dit
	Speed	1 ~ 100 000[nulse/s]	0	K804	K1104	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD402	%KD552	
	Dwell	0 ~ 50,000[unit: ms]	0	K806	K1106	Word
	DMell		U	%KW806	%KW1106	vvolu

Ston	Item	Satting range	Initial	Dedicate	ed K area	Doto cizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K8184	K11184	
	Coord.	0 . ABS, 1 . INC	ADO	%KX13092	%KX17892	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K8182~83	K11182~83	
	1 attern	0. END, 1. REEL, 2. CONT	LIND	%KX13090~91	%KX17890~91	Bit
	Control	0 : POS, 1 : SPD	POS	K8181	K11181	
	Control	0.103, 1.310	F03	%KX13089	%KX17889	Bit
	Method	0 : SIN, 1 : REP	SIN	K8180	K11180	Bit
	Wicthod	0.5IIV, 1.1VEI	Ollv	%KX13088	%KX17888	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K819	K1119	Word
00	KEP Step	0 ~ 30 (0 ~ 80 for flight - end)	U	%KW819	%KW1119	
29	Address	0.447.400.0400.447.400.047.11	0	K810	K1110	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	%KD405	%KD555	Double word
	M Code	0 ~ 65.535	0	K817	K1117	Word
	W Code	0 ~ 65,555	U	%KW817	%KW1117	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K8186~87	K11186~87	Bit
	A/D No.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX13094~95	%KX17894~95	DIL
	Spood	1 - 100 000[puloo/o]	0	K814	K1114	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD407	%KD557	
	Dwell	0 - 50 000[unitumo]	0	K816	K1116	Word
	Dwell	0 ~ 50,000[unit:ms]	U	%KW816	%KW1116	vvoiu

Ston	Itam	Softing rouge	Initial	Dedicate	ed K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K8284	K11284	
	Coord.	0 . ADO, 1 . INC	ADO	%KX13252	%KX18052	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K8282~83	K11282~83	ъ:
	1 ditoiii	O. END, T. KEEF, Z. OOM	LIVE	%KX13250~51	%KX18050~51	Bit
	Control	0 : POS, 1 : SPD	POS	K8281	K11281	D:1
	Oontroi	0.1 00, 1.01 2	1 00	%KX13249	%KX18049	Bit
	Method	0 : SIN, 1 : REP	SIN	K8280	K11280	Bit
		O. SIIV, T. IXEI	Onv	%KX13248	%KX18048	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K829	K1129	Word
30			Ů	%KW829	%KW1129	
00	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K820	K1120	Double word
	[pulse]	2,117,100,010 2,117,100,017 [paido]	Ů	%KD410	%KD560	Double Word
	M Code	0 ~ 65,535	0	K827	K1127	Word
	W Oodo	0 00,000	Ů	%KW827	%KW1127	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K8286~87	K11286~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX13254~55	%KX18054~55	DIL
	Speed	1 ~ 100,000[pulse/s]		K824	K1124	Double word
	Speed	1 100,000[puise/s]	0	%KD412	%KD562	
	Dwell	0 ~ 50,000[unit:ms]	0	K826	K1126	Word
	DWell	0 30,000[unit]	U	%KW826	%KW1126	vvolu

• Operation step 31~80 is available for only high end type (H type).

Ctor	lt a ma	Cotting warms	Initial	Dedicate	ed K area	Data aire
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	O · ARS 1 · INC	ABS	K23484	K28484	
	Coord.	0 : ABS, 1 : INC	ADS	%KX37572	%KX45572	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K23482~83	K28482~83	
	1 attern	U. LIND, T. INELT, 2. GOINT	LIND	%KX37570~71	%KX45570~71	Bit
	Control	0 : POS, 1 : SPD	POS	K23481	K28481	
	Control	0 . FOS, 1 . SFD	SIN	%KX37569	%KX45569	Bit
	Method	0 : SIN, 1 : REP		K23480	K28480	Bit
	Metriod	Ju U. JIII, T. INEI	%KX37568	%KX45568	Dit	
	REP Step 0 ~ 30 (0 ~ 80 for high - end) 0	K2349	K2849			
31	KEP Step	0 ~ 30 (0 ~ 80 for flight - end)	U	%KW2349	%KW2849	Word
01	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2340	K2840	Double
	[pulse]	-2,147,403,040 2,147,403,047 [pulse]	U	%KD1170	%KD1420	word
	M Code	0 ~ 65.535	0	K2347	K2847	Word
	W Code	0 ~ 00,000	U	%KW2347	%KW2847	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K23486~87	K28486~87	Bit
	A/D No.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX37574~75	%KX45574~75] BIT
	Speed	1 - 100 000[nuloo/o]	0	K2344	K2844	Double
	Speed	1 ~ 100,000[pulse/s]	0	%KD1172	%KD1422	word
	Durall	0 50 000[it.mo]	0	K2346	K2846	\\/ a = d
	Dwell	0 ~ 50,000[unit:ms]	0	%KW2346	%KW2846	Word

Ston	Item	Softing rongs	Initial	Dedicate	ed K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K23584	K28584	
	Coold.	U. ABO, T. INC	ADO	%KX37732	%KX45732	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K23582~83	K28582~83	D:#
	1 attern	O. END, T. REEF, Z. GOINT	LIND	%KX37730~31	%KX45730~31	Bit
	Control	0 : POS, 1 : SPD	POS	K23581	K28581	D.,
	Control	0.1 00, 1.01 B	1 00	%KX37729	%KX45729	Bit
	Method	0 : SIN, 1 : REP	SIN	K23580	K28580	Bit
	Metriod	Would V. Oliv, T. INET	SIN	%KX37728	%KX45728	Dit
	REP Step 0 ~ 30 (0 ~ 80 for high - end)	$0 \sim 30 \ (0 \sim 80 \text{ for high - end})$	0	K2359	K2859	
32		U	%KW2359	%KW2859	Word	
32	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2350	K2850	Double
	[pulse]	-2,147,463,046 -2,147,463,047 [pulse]	U	%KD1175	%KD1425	word
	M Code	0 ~ 65.535	0	K2357	K2857	Word
	W Code	0 ~ 65,555	U	%KW2357	%KW2857	vvoid
	A/D No.	0 · No 1 1 · No 2 2 · No 2 2 · No 4	0	K23586~87	K28586~87	Bit
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX37734~35	%KX45734~35	DIL
	Cross	4 400 000[mula a /a]	0	K2354	K2854	Double
	Speed	1 ~ 100,000[pulse/s]	0	%KD1177	%KD1427	word
	Describ	0 50 0000	0	K2356	K2856	Word
	Dwell	0 ~ 50,000[unit:™S]	0	%KW2356	%KW2856	Word

Ston	Itom	Sotting rouge	Initial	Dedicate	ed K area	Data size
Step	Item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K23684	K28684	
	Coord.	U. ABS, T. INC	ADS	%KX37892	%KX45892	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K23682~83	K28682~83	
	1 attorn	O. LIND, T. INELLY, 2. GOINT	LIND	%KX37890~91	%KX45890~91	Bit
	Control	0 : POS, 1 : SPD	POS	K23681	K28681	
	Control	Method 0 : SIN, 1 : REP SIN —	%KX37889	%KX45889	Bit	
	Method		K23680	K28680	Bit	
	Wicthod		Ollv	%KX37888	%KX45888	Dit
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2369	K2869	
33	INEI Otep	0 - 30 (0 - 60 for riight - end)		%KW2369	%KW2869	Word
00	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2360	K2860	Double
	[pulse]	-2,147,403,040 2,147,403,047 [pulse]	U	%KD1180	%KD1430	word
	M Code	0 ~ 65,535	0	K2367	K2867	Word
	W Code	0 ~ 65,555	U	%KW2367	%KW2867	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K23686~87	K28686~87	Bit
	A/D No.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX37894~95	%KX45894~95	Ыl
	Spood	1 ~ 100 000[pulco/c]	0	K2364	K2864	Double
	Speed	1 ~ 100,000[pulse/s]	0	%KD1182	%KD1432	word
	Dwell	0 ~ 50,000[unit:ms]	0	K2366	K2866	Word
	DWell	0 30,000[uiiit.iii0]	U	%KW2366	%KW2866	vvolu

Step	Item	Satting range	Initial	Dedicate	ed K area	Data size
Step	iteiii	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K23784	K28784	
	Coord.	U. ADS, T. INC	ADS	%KX38052	%KX46052	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K23782~83	K28782~83	
	1 attern	U. LIND, T. KLLI, Z. GOINT	LIND	%KX38050~51	%KX46050~51	Bit
	Control	0 : POS, 1 : SPD	POS	K23781	K28781	
	Control	0.100, 1.010	1 03	%KX38049	%KX46049	Bit
	Method 0 : SIN, 1 : REP	0 · SIN 1 · REP	SIN	K23780	K28780	Bit
	Wictiod	O. OIN, T. INEI	Ollv	%KX38048	%KX46048	Dit
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2379	K2879	Word
			, °	%KW2379	%KW2879	
34	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2370	K2870	Double word
	[pulse]			%KD1185	%KD1435	
	M Code	0 ~ 65,535	0	K2377	K2877	Word
	W Code	0 * 00,000	U	%KW2377	%KW2877	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K23786~87	K28786~87	Dit
	A/D NO.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX38054~55	%KX46054~55	Bit
	0 1	4 400 0007 1 / 1		K2374	K2874	Double
	Speed	1 ~ 100,000[pulse/s]	0	%KD1187	%KD1437	word
	Durall	0 50 000[;t.mo]	0	K2376	K2876)//owd
	Dwell	0 ~ 50,000[unit:ms]	0	%KW2376	%KW2876	Word

Ston	Item	Sotting range	Initial	Dedicate	ed K area	Data sizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K23884	K28884	
	Coord.	U. ADO, T. INC	ADO	%KX38212	%KX46212	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K23882~83	K28882~83	
		O. END, T. REET, 2. CONT	LIND	%KX38210~11	%KX46210~11	Bit
	Control	0 : POS, 1 : SPD	POS	K23881	K28881	
	Control	0.1 00, 1.01 B	1 00	%KX38209	%KX46209	Bit
	Method	0 : SIN, 1 : REP	SIN	K23880	K28880	Bit
		0 . OIIV, 1 . IVEI	Onv	%KX38208	%KX46208	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2389	K2889	Word
35				%KW2389	%KW2889	
00	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2380	K2880	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [puise]	0	%KD1190	%KD1440	
	M Code	0 ~ 65,535	0	K2387	K2887	Word
	W Code	0 ~ 00,000	0	%KW2387	%KW2887	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K23886~87	K28886~87	Bit
	A/D No.	0.140.1, 1.140.2, 2.140.0, 0.140.4		%KX38214~15	%KX46214~15	DIL
	Speed	1 ~ 100,000[pulse/s]	0	K2384	K2884	Double word
	Speed	1 100,000[puisc/s]		%KD1192	%KD1442	
	Dwell	0 ~ 50,000[unit:ms]	0	K2386	K2886	Word
	וויייייי	0 30,000[drift]	U	%KW2386	%KW2886	vvolu

Step	Item	Sotting range	Initial	Dedicate	d K area	Data size
Step	iteiii	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K23984	K28984	
	Ooord.	0 . ABO, 1 . IIVO	ABO	%KX38372	%KX46372	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K23982~83	K28982~83	D.;
	1 attorn	O . END, T . REEF , 2 . GOINT	LIND	%KX38370~71	%KX46370~71	Bit
	Control	0 : POS, 1 : SPD	POS	K23981	K28981	Bit
	Control	0.1 00, 1.01 B	1 00	%KX38369	%KX46369	
	Method	0 : SIN, 1 : REP	SIN	K23980	K28980	Bit
		0.0114, 1.11C1	Onv	%KX38368	%KX46368	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2399	K2899	Word
36				%KW2399	%KW2899	
00	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2390	K2890	Double word
	[pulse]	2,117,100,010 2,117,100,017 [paido]		%KD1195	%KD1445	
	M Code	0 ~ 65,535	0	K2397	K2897	Word
	W CCGC	0 00,000		%KW2397	%KW2897	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K23986~87	K28986~87	Bit
	A/D No.	0.140.1, 1.140.2, 2.140.0, 0.140.4	U	%KX38374~75	%KX46374~75	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K2394	K2894	Double word
	Ореец	1 100,000[pui36/3]	0	%KD1197	%KD1447	
	Dwell	0 ~ 50,000[unit:ms]	0	K2396	K2896	Word
	DWell			%KW2396	%KW2896	vvoiu

Ston	Itam	Sotting rouge	Initial	Dedicate	ed K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K24084	K29084	
	00014.	U. ABO, T. INC	ADO	%KX38532	%KX46532	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24082~83	K29082~83	
		O. END, T. IXELT, Z. GOIVI	LIVE	%KX38530~31	%KX46530~31	Bit
	Control	0 : POS, 1 : SPD	POS	K24081	K29081	
	Control	0.100, 1.010	1 00	%KX38529	%KX46529	Bit
	Method	0 : SIN, 1 : REP	SIN	K24080	K29080	Bit
		O. OIN, T. INCI	Ollv	%KX38528	%KX46528	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2409	K2909	Word
37			Ŭ	%KW2409	%KW2909	
37	Address	2.447.402.6402.447.402.647.[m.:la.a]	0	K2400	K2900	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]		%KD1200	%KD1450	
	M Code	0 ~ 65.535	0	K2407	K2907	Word
	W Code	0 ~ 00,000	U	%KW2407	%KW2907	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K24086~87	K29086~87	Bit
	A/D No.	0 . 110.1, 1 . 110.2, 2 . 110.3, 3 . 110.4	U	%KX38534~35	%KX46534~35	DIL
	Speed	$1 \sim 100000$ [nulse/s]	0	K2404	K2904	Double word
	Ореец	1 ~ 100,000[pulse/s]	U	%KD1202	%KD1452	Double Word
	Dwell	0 ~ 50,000[unit:ms]	0	K2406	K2906	Word
	DWEII		J	%KW2406	%KW2906	vvolu

Step	Itom	Setting range	Initial	Dedicate	d K area	Data size
Step	Item	Setting range	value	X axis	Y axis	Data Size
	Coord.	O · ABS 1 · INC	ABS	K24184	K29184	
	Coord.	0 : ABS, 1 : INC	ADS	%KX38692	%KX46692	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24182~83	K29182~83	
	Pattern	U. END, T. KEEP, Z. CONT	END	%KX38690~91	%KX46690~91	Bit
	Control	0 : POS, 1 : SPD	POS	K24181	K29181	
	Control	0.703, 1.370	F03	%KX38689	%KX46689	Bit
	Method	0 : SIN, 1 : REP	SIN	K24180	K29180	Dit
	Welliod O. Silv, T. IXET	SIN	%KX38688	%KX46688	Bit	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2419	K2919	
20	NEF Step		U	%KW2419	%KW2919	Word
38	Address	2 147 492 649 - 2 147 492 647 [pulgo]	0	K2410	K2910	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	U	%KD1205	%KD1455	
	M Code	0 ~ 65,535	0	K2417	K2917	Word
	W Code	0 ~ 65,555	U	%KW2417	%KW2917	vvoid
	A/D No.	0 - No 1 1 - No 2 2 - No 2 2 - No 4	0	K24186~87	K29186~87	D:+
	A/D NO.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX38694~95	%KX46694~95	Bit
	Speed	1 ~ 100,000[pulse/s]	0	K2414	K2914	Double word
	Speed	1 - 100,000[pulse/s]	U	%KD1207	%KD1457	Double Word
	Dwell	0 ~ 50 000[upit:ms]	0	K2416	K2916	Word
	Dweii	0 ~ 50,000[unit:ms]	0	%KW2416	%KW2916	vvord

Ston	Item	Satting range	Initial	Dedicate	d K area	- Data size
Step	item	Setting range	value	X axis	Y axis	
	Coord.	0 : ABS, 1 : INC	ABS	K24284	K29284	
	Coord.	U. ABS, T. INC	ABS	%KX38852	%KX46852	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24282~83	K29282~83	Bit
	1 attern	U. LIND, T. KELT, Z. CONT	LIND	%KX38850~51	%KX46850~51	
	Control	0 : POS, 1 : SPD	POS	K24281	K29281	
	Control	5.1.00, 1.01.0	PU3	%KX38849	%KX46849	Bit
	Method	0 : SIN, 1 : REP	SIN	K24280	K29280	- Bit
		O. SIN, T. INCI	SIIV	%KX38848	%KX46848	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2429	K2929	Word
00			U	%KW2429	%KW2929	
39	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2420	K2920	Double word
	[pulse]	-2,147,465,046 -2,147,465,047 [pulse]		%KD1210	%KD1460	
	M Code	0 ~ 65,535	0	K2427	K2927	Word
	W Code	0~05,535	U	%KW2427	%KW2927	vvoid
	A/D Na	0 . No 4 4 . No 2 2 . No 2 2 . No 4		K24286~87	K29286~87	D:t
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	%KX38854~55	%KX46854~55	Bit
	Spood	1 - 100 000[puloo/o]	0	K2424	K2924	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1212	%KD1462	
	Durall	0 50 000[0	K2426	K2926	\\/ord
	Dwell	0 ~ 50,000[unit:ms]	U	%KW2426	%KW2926	Word

Cton	Itom	Cotting rouge	Initial	Dedicate	ed K area	Data size
Step	ltem	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K24384	K29384	
	Coolu.	U.ABS, T.INC	ADS	%KX39012	%KX47012	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24382~83	K29382~83	Bit
	1 attern	O. LIND, T. INELT, 2. COINT	LIND	%KX39010~11	%KX47010~11	
	Control	0 : POS, 1 : SPD	POS	K24381	K29381	
	Control	100	%KX39009	%KX47009	Bit	
	Method	0 : SIN, 1 : REP	SIN	K24380	K29380	Bit
		0. SIN, 1. INEI	Silv	%KX39008	%KX47008	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2439	K2939	Word
40			U	%KW2439	%KW2939	
40	Address	0.447.400.0400.447.400.047.11		K2430	K2930	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	%KD1215	%KD1465	
	M Code	0 ~ 65.535	0	K2437	K2937	Word
	W Code	0 ~ 65,535	U	%KW2437	%KW2937	vvord
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K24386~87	K29386~87	Bit
	A/D No.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX39014~15	%KX47014~15	Bit
	Spood	1 - 100 000[pulgo/o]	0	K2434	K2934	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1217	%KD1467	
	Dwell	0 50 000[::::it.mo]	0	K2436	K2936	Word
	DMCII	0 ~ 50,000[unit: ^{ms}]	U	%KW2436	%KW2936	vvoid

Ston	Itam	Softing rouge	Initial	Dedicate	ed K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K24484	K29484	
	Coord.	0 . ADO, 1 . INC	ADO	%KX39172	%KX47172	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24482~83	K29482~83	Bit
		O . END, T . INCEL , Z . GOINT	LIVE	%KX39170~71	%KX47170~71	
	Control	0 : POS, 1 : SPD	POS	K24481	K29481	
	Control	0.1 00, 1.01 B	1 00	%KX39169	%KX47169	Bit
	Method	0 : SIN, 1 : REP	SIN	K24480	K29480	- Bit
		O. OIIV, T. INCI	Onv	%KX39168	%KX47168	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2449	K2949	Word
41				%KW2449	%KW2949	
41	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2440	K2940	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [pulse]	U	%KD1220	%KD1470	
	M Code	0 ~ 65,535	0	K2447	K2947	Word
	W Code	0 ~ 65,555	U	%KW2447	%KW2947	vvoid
	A/D No.	0 · No 1 1 · No 2 2 · No 2 2 · No 4	0	K24486~87	K29486~87	Bit
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX39174~75	%KX47174~75	DIL
	Spood	1 - 100 000[puloo/o]	0	K2444	K2944	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1222	%KD1472	
	Dwell	0 - 50 000[unitumo]	0	K2446	K2946	Word
	DWell	0 ~ 50,000[unit:™S]	U	%KW2446	%KW2946	vvoiu

Ston	Item	Setting range	Initial	Dedicate	ed K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K24584	K29584	
	Ooord.	0 . ABG, 1 . IIVG	ADO	%KX39332	%KX47332	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24582~83	K29582~83	
	rattern	O. LIND, T. INELLI, Z. COINT	LIND	%KX39330~31	%KX47330~31	Bit
	Control	0 : POS, 1 : SPD	POS	K24581	K29581	
	Control	0.1 00, 1.01 D	1 00	%KX39329	%KX47329	Bit
	Method	0 : SIN, 1 : REP	SIN	K24580	K29580	Bit
		0. SIN, 1. INEI	Ollv	%KX39328	%KX47328	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2459	K2959	Word
	INLI Olep		U	%KW2459	%KW2959	
42	Address			K2450	K2950	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	%KD1225	%KD1475	
	M Code	0 ~ 65,535	0	K2457	K2957	Word
	W Code	0 00,000	Ů	%KW2457	%KW2957	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K24586~87	K29586~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX39334~35	%KX47334~35	Dit
	Speed	1 ~ 100 000[nulse/s]	0	K2454	K2954	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1227	%KD1477	
	Durall	0 50 000f w it mol	0	K2456	K2956	Mord
	Dwell	0 ~ 50,000[unit:ms]	0	%KW2456	%KW2956	Word

Ston	Item	Sotting rouge	Initial	Dedicate	ed K area	Doto cizo
Step	iteiii	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K24684	K29684	
	Coord.	U. ABS, T. INC	71.50	%KX39492	%KX47492	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24682~83	K29682~83	
		O. END, T. REET, Z. OOM	2112	%KX39490~91	%KX47490~91	Bit
	Control	ntrol 0 : POS, 1 : SPD POS	POS	K24681	K29681	р.;
	Oontroi		%KX39489	%KX47489	Bit	
	Method	0 : SIN, 1 : REP	SIN	K24680	K29680	Bit
		O. OIN, T. INC.	Onv	%KX39488	%KX47488	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2469	K2969	Word
43			"	%KW2469	%KW2969	
40	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2460	K2960	Double word
	[pulse]	-2,147,465,046 2,147,465,047 [pulse]	U	%KD1230	%KD1480	
	M Code	0 ~ 65.535	0	K2467	K2967	Word
	W Code	0 ~ 65,555	U	%KW2467	%KW2967	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K24686~87	K29686~87	Bit
	A/D NO.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX39494~95	%KX47494~95	Dit
	Speed	$1 \sim 100000$ [pulse/s]	0	K2464	K2964	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1232	%KD1482	
	Dwell	0 - 50 000[upit:ms]	0	K2466	K2966	Word
	DMell	0 ~ 50,000[unit:ms]	U	%KW2466	%KW2966	vvolu

Step	Item	Sotting range	Initial	Dedicate	ed K area	Data size
Step	itein	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K24784	K29784	
	Ocord.	U. ABS, T. INC	ADS	%KX39652	%KX47652	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24782~83	K29782~83	
	1 attern	U. LIND, T. RELLI, Z. CONT	LIND	%KX39650~51	%KX47650~51	Bit
	Control	0 : POS, 1 : SPD	POS	K24781	K29781	
		0.100, 1.012	1 00	%KX39649	%KX47649	Bit
	Method	0 : SIN, 1 : REP	SIN	K24780	K29780	- Bit
		0.0IIV, 1.1VLI	Ollv	%KX39648	%KX47648	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2479	K2979	Word
44			U U	%KW2479	%KW2979	
44	Address	-2.147,483,648~2,147,483,647 [pulse]	0	K2470	K2970	Double word
	[pulse]	-2,147,403,040 -2,147,403,047 [pulse]	U	%KD1235	%KD1485	
	M Code	0 ~ 65,535	0	K2477	K2977	Word
	M Code	0 ~ 65,555	U	%KW2477	%KW2977	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K24786~87	K29786~87	Bit
	A/D No.	0 . No. 1, 1 . No. 2, 2 . No. 3, 3 . No. 4	U	%KX39654~55	%KX47654~55	Dit
	Spood	1 - 100 000[puloo/o]	0	K2474	K2974	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1237	%KD1487	
	Dwell	0 ~ 50,000[unit: ms]	0	K2476	K2976	Word
	Dweii			%KW2476	%KW2976	vvolu

Ston	Item	Sotting rouge	Initial	Dedicate	d K area	Doto cizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K24884	K29884	
	Coord.	U.ABS, T. INC	ADO	%KX39812	%KX47812	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24882~83	K29882~83	Bit
	1 attorn	O. LIND, T. INELLY, 2. CONT	LIND	%KX39810~11	%KX47810~11	
	Control	0 : POS, 1 : SPD	POS	K24881	K29881	
	Control	0.1 00, 1.01 5	1 00	%KX39809	%KX47809	Bit
	Method	0 : SIN, 1 : REP	SIN	K24880	K29880	Bit
		O. Oliv, T. INEL	Onv	%KX39808	%KX47808	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2489	K2989	Word
45			Ů	%KW2489	%KW2989	
40	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2480	K2980	Double word
	[pulse]	2,147,400,040 2,147,400,047 [puise]		%KD1240	%KD1490	
	M Code	0 ~ 65,535	0	K2487	K2987	Word
	W Code	0 ~ 65,555	U	%KW2487	%KW2987	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K24886~87	K29886~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX39814~15	%KX47814~15	DIL
	Speed	1 ~ 100,000[pulse/s]	0	K2484	K2984	Double word
	Speed	1 100,000[pui30/3]	<u> </u>	%KD1242	%KD1492	
	Dwell	0 ~ 50,000[unit:ms]	0	K2486	K2986	Word
	DWCII	0 00,000[unit]	U	%KW2486	%KW2986	vvolu

Ston	Itam	Setting young	Initial	Dedicate	ed K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K24984	K29984	
	Coord.	U.ABS, T. INC	ADS	%KX39972	%KX47972	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K24982~83	K29982~83	
	1 attern	U. LIND, T. KELI, Z. CONT	LIND	%KX39970~71	%KX47970~71	Bit
	Control	0 : POS, 1 : SPD	POS	K24981	K29981	
	Control	0.103, 1.310	F03	%KX39969	%KX47969	Bit
	Method	0 : SIN, 1 : REP	SIN	K24980	K29980	- Bit
		0.3IN, 1.INEI	Ollv	%KX39968	%KX47968	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2499	K2999	Word
46	IXLI Step	0 - 30 (0 - 00 for flight - end)	U	%KW2499	%KW2999	
40	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2490	K2990	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [pulse]	Ů	%KD1245	%KD1495	
	M Code	0 ~ 65,535	0	K2497	K2997	Word
	W Code	0 00,000	Ů	%KW2497	%KW2997	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K24986~87	K29986~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	Ů	%KX39974~75	%KX47974~75	Bit
	Speed	1 ~ 100 000[nulse/s]	0	K2494	K2994	Double word
	Ореец	1 ~ 100,000[pulse/s]	U U	%KD1247	%KD1497	Double Word
	Dwell	0 - 50 000[upit/ms]	0	K2496	K2996	Word
	DWell	0 ~ 50,000[unit:ms]		%KW2496	%KW2996	vvoiu

Ston	Item	Softing range	Initial	Dedicate	ed K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K25084	K30084	
	occiu.	0 . ABS, 1 . INC	ADO	%KX40132	%KX48132	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25082~83	K30082~83	D.,
		0. END, 1. NEEL , 2. 00111		%KX40130~31	%KX48130~31	Bit
	Control	0 : POS, 1 : SPD	POS	K25081	K30081	D.,
	Control	0.1 00, 1.01 D	1 00	%KX40129	%KX48129	Bit
	Method	0 : SIN, 1 : REP	SIN	K25080	K30080	Bit
		O. SIIV, T. INEI	Onv	%KX40128	%KX48128	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2509	K3009	Word
47			Ů	%KW2509	%KW3009	
47	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2500	K3000	Double word
	[pulse]	-2,147,403,040 2,147,403,047 [puise]	U	%KD1250	%KD1500	
	M Code	0 ~ 65,535	0	K2507	K3007)
	M Code	0~05,535	U	%KW2507	%KW3007	Word
	A/D No.	0 . No 1 1 . No 2 2 . No 2 2 . No 4	0	K25086~87	K30086~87	Bit
	A/D NO.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX40134~35	%KX48134~35	DIL
	Chood	1 - 100 000[pulpo/c]	0	K2504	K3004	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1252	%KD1502	
	Dwall	0 50 000[::::it.mo]	0	K2506	K3006	\\/ord
	Dwell	0 ~ 50,000[unit:ms]	0	%KW2506	%KW3006	Word

Step	Itom	Satting range	Initial	Dedicate	d K area	Data size
Step	ltem	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K25184	K30184	
	Coord.	0 . ABS, 1 . INC	ADO	%KX40292	%KX48292	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25182~83	K30182~83	
	1 ditem	O. LIND, T. INELL, 2. COINT	LIVE	%KX40290~91	%KX48290~91	Bit
	Control 0 : POS, 1 : SPD POS	0 : POS, 1 : SPD	POS	K25181	K30181	
		%KX40289	%KX48289	Bit		
	Method	0 : SIN, 1 : REP	SIN	K25180	K30180	Bit
		0.5IN, 1.1NEI	Silv	%KX40288	%KX48288	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2519	K3019	Word
48			0	%KW2519	%KW3019	
40	Address	2.147.492.649 - 2.147.492.647 [pulge]	0	K2510	K3010	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	U	%KD1255	%KD1505	
	M Code	0 ~ 65.535	0	K2517	K3017	\A/ = ==I
	W Code	0 ~ 65,555	U	%KW2517	%KW3017	Word
	A/D No.	0 · No 1 1 · No 2 2 · No 3 3 · No 4	0	K25186~87	K30186~87	Dit
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX40294~95	%KX48294~95	Bit
	Spood	1 ~ 100 000[pulso/s]		K2514	K3014	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1257	%KD1507	Double Word
	Dwell	0	0	K2516	K3016	Mord
	Dwell	0 ~ 50,000[unit:ms]	U	%KW2516	%KW3016	Word

Ston	ltom	Satting vange	Initial	Dedicate	d K area	Data size
Step	Item	Setting range	value	X axis	Y axis	Data Size
	Coord.	O · ARS 1 · INC	ABS	K25284	K30284	
	Coord.	0 : ABS, 1 : INC	ADS	%KX40452	%KX48452	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25282~83	K30282~83	
	1 attern	O. LIND, T. INCLET, 2. COINT	LIND	%KX40450~51	%KX48450~51	Bit
	Control	0 : POS, 1 : SPD	POS	K25281	K30281	
	Control	0.1 00, 1.01 D	1 03	%KX40449	%KX48449	Bit
	Method	0 : SIN, 1 : REP	SIN	K25280	K30280	Bit
	Wictilod	0.000, 1.112	%KX40448	%KX48448	Sit.	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2529	K3029	Word
49	INEI OIOP	0 30 (0 00 for high - cha)		%KW2529	%KW3029	
43	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2520	K3020	Double word
	[pulse]	-2, 147, 400,040 2, 147, 400,047 [pulse]	Ů	%KD1260	%KD1510	
	M Code	0 ~ 65,535	0	K2527	K3027	Word
	W Code	0 - 05,555	U	%KW2527	%KW3027	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K25286~87	K30286~87	Bit
	A/D No.	0 . 110.1, 1 . 110.2, 2 . 110.3, 3 . 110.4	U	%KX40454~55	%KX48454~55	Dit
	Speed	$1 \sim 100.000$ [nulse/s]	0	K2524	K3024	Double word
	Speed	1 ~ 100,000[pulse/s]		%KD1262	%KD1512	Bodbic Word
,	Dwell	0 ~ 50,000[unit: ms]	0	K2526	K3026	Word
	DWCII	o oo,ooolumiioj	J	%KW2526	%KW3026	VVOIG

Ston	Itom	Softing range	Initial	Dedicate	d K area	Doto cizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K25384	K30384	
	Coold.	U. ABS, T. INC	ABS	%KX40612	%KX48612	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25382~83	K30382~83]
	1 attern	U. LIND, T. RELL, Z. CONT	LIND	%KX40610~11	%KX48610~11	Bit
	Control	0 : POS, 1 : SPD	POS	K25381	K30381	
	Control	0.103, 1.31 B	1 03	%KX40609	%KX48609	Bit
	Method	0 : SIN, 1 : REP	SIN	K25380	K30380	- Bit
		U. SIN, T. INEI	Silv	%KX40608	%KX48608	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2539	K3039	
50			0	%KW2539	%KW3039	Word
50	Address	2 147 492 649 - 2 147 492 647 [mulga]	0	K2530	K3030	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	U	%KD1265	%KD1515	
	M Code	0 ~ 65,535	0	K2537	K3037	Word
	W Code	0 ~ 65,555	U	%KW2537	%KW3037	vvoid
	A /D N -	0. No. 4. 4. No. 0. 0. No. 0. 0. No. 4.	0	K25386~87	K30386~87	D:4
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	%KX40614~15	%KX48614~15	Bit
	Spood	1 ~ 100 000[pulso/s]	0	K2534	K3034	- Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1267	%KD1517	
	Dwell	0 - 50 000[unitumo]	0	K2536	K3036	Word
	Dwell	0 ~ 50,000[unit:™S]	U	%KW2536	%KW3036	vvold

Step	Item	Sotting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K25484	K30484	
	Coord.	0 . ABS, 1 . INC	ADO	%KX40772	%KX48772	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25482~83	K30482~83	Bit
	1 ditem	O. LIND, T. INELL , Z. OOM	LIVE	%KX40770~71	%KX48770~71	
	Control	Control 0 : POS, 1 : SPD POS	POS	K25481	K30481	
	Control		%KX40769	%KX48769	Bit	
	Method	0 : SIN, 1 : REP	SIN	K25480	K30480	Bit
		U. SIN, I. REP	SIN	%KX40768	%KX48768	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2549	K3049	Word
51			U	%KW2549	%KW3049	
01	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2540	K3040	Double word
	[pulse]	-2, 147, 403, 040 2, 147, 403, 047 [puise]	U	%KD1270	%KD1520	
	M Code	0 ~ 65,535	0	K2547	K3047	Word
	W Code	0 - 00,000	0	%KW2547	%KW3047	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K25486~87	K30486~87	Bit
	A/D No.	0.140.1, 1.140.2, 2.140.0, 3.140.4	0	%KX40774~75	%KX48774~75	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K2544	K3044	Double word
	Speed	1 ~ 100,000[puise/s]	U	%KD1272	%KD1522	Boasio Word
	Dwell	0 ~ 50,000[unit:ms]	0	K2546	K3046	Word
	DWCII	0 00,000[um]		%KW2546	%KW3046	VVOIG

Ston	Itama	Setting rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K25584	K30584	
	Coord.	U.ABG, T. INC	ADO	%KX40932	%KX48932	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25582~83	K30582~83	Bit
		U. LIND, T. KELL, Z. CONT	LIND	%KX40930~31	%KX48930~31	
	Control	0 : POS, 1 : SPD	POS	K25581	K30581	
	Control	0.100, 1.015	%KX40929	%KX48929	Bit	
	Method	0 : SIN, 1 : REP	SIN	K25580	K30580	- Bit
		U. SIIV, T. INCI	Ollv	%KX40928	%KX48928	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2559	K3059	Word
52			, ·	%KW2559	%KW3059	
52	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2550	K3050	- Double word
	[pulse]	-2,147,400,040 2,147,400,047 [puise]	U	%KD1275	%KD1525	
	M Code	0 ~ 65,535	0	K2557	K3057	Word
	W Code	0 00,000	Ŭ	%KW2557	%KW3057	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K25586~87	K30586~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX40934~35	%KX48934~35	Dit
	Spood	1 ~ 100 000[pulso/s]	0	K2554	K3054	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1277	%KD1527	Double word
	Dwell	0 ~ 50,000[unit:ms]	0	K2556	K3056	Word
	DWell		0	%KW2556	%KW3056	vvolu

Step	Item	Setting range	Initial	Dedicate	d K area	Doto oizo
			value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K25684	K30684	
			ADO	%KX41092	%KX49092	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25682~83	K30682~83	
			LIND	%KX41090~91	%KX49090~91	Bit
	Control	0 : POS, 1 : SPD	POS	K25681	K30681	
			1 00	%KX41089	%KX49089	Bit
	Method	0 : SIN, 1 : REP	SIN	K25680	K30680	Bit
			Ollv	%KX41088	%KX49088	Dit
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2569	K3069	
53			Ů	%KW2569	%KW3069 Word	Word
30	Address [pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	K2560 K3060	Double word	
			U	%KD1280	%KD1530	Double Word
	M Code	0 ~ 65,535	0	K2567 K3067	Word	
			Ů	%KW2567	%KW3067	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K25686~87	K25686~87 K30686~87	Bit
			Ů	%KX41094~95	%KX49094~95	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K2564	K3064	Double word
			, ·	%KD1282	%KD1532	Boubic Word
	Dwell	0 ~ 50,000[unit:ms]	0	K2566	K3066	Word
				%KW2566	%KW3066	vvolu

Step	Item	Setting range	Initial	Dedicated K area		Doto oizo
			value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K25784	K30784	
			ADO	%KX41252	%KX49252	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25782~83 K30782~83	р.;	
	1 dttom		LIND	%KX41250~51	%KX49250~51	Bit
	Control	0 : POS, 1 : SPD	POS	K25781	K30781	D:1
			1 00	%KX41249	%KX49249	Bit
	Method	0 : SIN, 1 : REP	SIN	K25780	K30780 Bit	Rit
			Ont	%KX41248	%KX49248	Dit .
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2579	K3079	14 /5 1
54				%KW2579	%KW3079 Word	vvora
01	Address [pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	K2570 K3070	Double word	
			0	%KD1285	%KD1535	Double Word
	M Code	0 ~ 65,535	0	K2577 K3077	Word	
			U	%KW2577	%KW3077	vvord
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K25786~87	K25786~87 K30786~87	Bit
				%KX41254~55	%KX49254~55	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K2574	K3074	Double word
			J	%KD1287	%KD1537	Boabic Word
	Dwell	0 ~ 50,000[unit:ms]	0	K2576	K3076	Word
				%KW2576	%KW3076	vvolu

Step	Item	Setting range	Initial	Dedicated K area		Doto oizo
			value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K25884	K30884	Bit Bit Bit Word
			ADS	%KX41412	%KX49412	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25882~83	K25882~83 K30882~83	
	1 attorn		LIND	%KX41410~11	%KX49410~11	Bit
	Control	0 : POS, 1 : SPD	POS	K25881		
			1 03	%KX41409	%KX49409	Bit
	Method	0 : SIN, 1 : REP	SIN	K25880	K30880	30880 Bit
			Oliv	%KX41408	%KX49408	Dit
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2589	K3089	
55			U	%KW2589	%KW3089 Word	Word
55	Address [pulse]	-2,147,483,648~2,147,483,647 [pulse]	0	K2580	K3080 Double	Double word
			Ů	%KD1290		Double Word
	M Code	0 ~ 65,535	0	K2587 K3087	Word	
			Ů	%KW2587	%KW3087	vvord
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K25886~87	K25886~87 K30886~87	Rit
			Ů	%KX41414~15	%KX49414~15	Dit
	Speed	1 ~ 100,000[pulse/s]	0	K2584	K2584 K3084 Double we WKD1292 %KD1542	Double word
			0	%KD1292		Double Word
	Dwell	0 ~ 50,000[unit:ms]	0	K2586	K3086	Word
			U	%KW2586	%KW3086	

Step	Item	Setting range	Initial	Dedicated K area		Data size
			value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K25984	K30984	
			ADS	%KX41572	%KX49572	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K25982~83 K30982~83		
	i attern		LIND	%KX41570~71	%KX41570~71 %KX49570~71	Bit
	Control	0 : POS, 1 : SPD	POS	K25981	K25981 K30981 %KX41569 %KX49569 Bit	
	Control		F03	%KX41569		Bit
	Method	0 : SIN, 1 : REP	SIN	K25980	K25980 K30980 Bit	Dit.
			SIN	%KX41568		Dit
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2599		
			U	%KW2599		Word
56	Address [pulse]	-2,147,483,648~2,147,483,647 [pulse]		K2590 K3090	Davible ward	
			0	%KD1295	95 %KD1545 Doul	Double word
	M Code	0 ~ 65,535	0	K2597	K2597 K3097	Word
			U	%KW2597	%KW3097	
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4		K25986~87 K30986~87	D:+	
			0	%KX41574~75	%KX49574~75	Bit
	Speed	1 ~ 100,000[pulse/s]	0	K2594	K3094	Double word
			U	%KD1297	%KD1297 %KD1547	Double Word
	Dwell	0 ~ 50,000[unit:ms]	0	K2596	K3096	Word
			U	%KW2596	%KW3096	vvoid

Step	Item	Sotting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K26084	K31084	
	Coord.	0 . ABS, 1 . INC	ADO	%KX41732	%KX49732	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26082~83	K31082~83	Bit
	1 attern	O. LIND, T. INLLIT, 2. COINT	LIND	%KX41730~31	%KX49730~31	
	Control	0 : POS, 1 : SPD	POS	K26081	K31081	
	Control	0.103, 1.310	1 03	%KX41729	%KX49729	Bit
	Method	0 : SIN, 1 : REP	SIN	K26080	K31080	- Bit
		0.0IIV, 1.1VLI	Ollv	%KX41728	%KX49728	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2609	K3109	Word
57			U	%KW2609	%KW3109	
37	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2600	K3100	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [puise]		%KD1300	%KD1550	
	M Code	0 ~ 65,535	0	K2607	K3107	Word
	W Code	0 00,000	0	%KW2607	%KW3107	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K26086~87	K31086~87	Bit
	A/D No.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX41734~35	%KX49734~35	Dit
	Spood	1 - 100 000[puloo/o]	0	K2604	K3104	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1302	%KD1552	
	Dwell	0 - 50 000[unitumo]	0	K2606	K3106	Word
	DMell	0 ~ 50,000[unit:™s]	U	%KW2606	%KW3106	vvoiu

Cton	Itam	Setting range	Initial	Dedicate	ed K area	Data size
Step	Item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K26184	K31184	
	Coolu.	U. ADS, T. INC	ADS	%KX41892	%KX49892	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26182~83	K31182~83	Bit
	1 attern	U. LIND, T. RELLI, Z. CONT	LIND	%KX41890~91	%KX49890~91	
	Control	0 : POS, 1 : SPD	POS	K26181	K31181	
	Control	0.100, 1.012	1 00	%KX41889	%KX49889	Bit
	Method	0 : SIN, 1 : REP	SIN	K26180	K31180	Bit
		U. SIN, T. INEI	SIN	%KX41888	%KX49888	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2619	K3119	Word
58			U	%KW2619	%KW3119	
36	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2610	K3110	Double word
	[pulse]	-2,147,465,046 -2,147,465,047 [pulse]	U	%KD1305	%KD1555	
	M Code	0 ~ 65,535	0	K2617	K3117	Word
	W Code	0 ~ 65,555	U	%KW2617	%KW3117	vvoid
	A/D No.	0 · No 1 1 · No 2 2 · No 2 2 · No 4	0	K26186~87	K31186~87	Bit
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX41894~95	%KX49894~95	DIL
	Speed	1 ~ 100,000[pulse/s]	0	K2614	K3114	Double word
	Speed	1 - 100,000[puise/s]		%KD1307	%KD1557	Double word
	Describ	0 50 0001 111	0	K2616	K3116	\\/ a mel
	Dwell	0 ~ 50,000[unit:™s]	0	%KW2616	%KW3116	Word

Cton	Item	Setting range	Initial	Dedicate	d K area	Doto oizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K26284	K31284	
	Coord.	0 . ABO, 1 . INC	ADO	%KX42052	%KX50052	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26282~83	K31282~83	Bit
		U. END, T. REEF, Z. CONT	LIND	%KX42050~51	%KX50050~51	
	Control	0: POS, 1: SPD	POS	K26281	K31281	
	Control	0.100, 1.010	1 03	%KX42049	%KX50049	Bit
	Method	0 : SIN, 1 : REP	SIN	K26280	K31280	Bit
		O. Oliv, T. IXLI	Ollv	%KX42048	%KX50048	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2629	K3129	Word
59				%KW2629	%KW3129	
33	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2620	K3120	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [pulse]		%KD1310	%KD1560	
	M Code	0 ~ 65,535	0	K2627	K3127	Word
	W Code	0 ~ 03,333	U	%KW2627	%KW3127	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K26286~87	K31286~87	Bit
	A/D NO.	0 . No. 1, 1 . No. 2, 2 . No. 3, 3 . No. 4	U	%KX42054~55	%KX50054~55	DIL
	Spood	1 - 100 000[puloo/o]	0	K2624	K3124	Double word
-	Speed	1 ~ 100,000[pulse/s]	0	%KD1312	%KD1562	
	Dwell	0 ~ 50,000[unit:ms]	0	K2626	K3126	Word
	DWell		U	%KW2626	%KW3126	vvolu

Ston	Item	Softing range	Initial	Dedicate	d K area	Doto cizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K26384	K31384	
	Coord.	U. ABO, T. INC	ADO	%KX42212	%KX50212	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26382~83	K31382~83	Bit
	1 ditoiii	O. END, T. REEF, Z. GOINT	LIND	%KX42210~11	%KX50210~11	
	Control	0 : POS, 1 : SPD	POS	K26381	K31381	
	Oontroi		1 00	%KX42209	%KX50209	Bit
	Method	0 : SIN, 1 : REP	SIN	K26380	K31380	Bit
		0 . Oliv, 1 . IXE1	Onv	%KX42208	%KX50208	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2639	K3139	Word
60				%KW2639	%KW3139	
00	Address	-2,147,483,648~2,147,483,647 [pulse]	ulse] 0	K2630	K3130	Double word
	[pulse]	2,147,400,040 2,147,400,047 [puise]		%KD1315	%KD1565	
	M Code	0 ~ 65,535	0	K2637	K3137	Word
	W Oode	0 00,000		%KW2637	%KW3137	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K26386~87	K31386~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX42214~15	%KX50214~15	DIL
	Spood	1 ~ 100,000[pulse/s]	0	K2634	K3134	Double word
	Speed	1 - 100,000[puise/s]	U	%KD1317	%KD1567	Double word
	Dwell	0 - F0 000[unitume]	0	K2636	K3136	Word
	DWell	0 ~ 50,000[unit:™S]	0	%KW2636	%KW3136	vvolu

Step	Item	Setting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K26484	K31484	
	Coord.	0 . ABS, 1 . INC	ADO	%KX42372	%KX50372	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26482~83	K31482~83	
	1 attern	O. LIND, T. INLLIT, 2. COINT	LIND	%KX42370~71	%KX50370~71	Bit
	Control	0 : POS, 1 : SPD	POS	K26481	K31481	
	Control		%KX42369	%KX50369	Bit	
	Method	0 : SIN, 1 : REP	SIN	K26480	K31480	- Bit
		0.0IIV, 1.1XEI	Ollv	%KX42368	%KX50368	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2649	K3149	Word
61			· ·	%KW2649	%KW3149	
01	Address	-2.147,483,648~2,147,483,647 [pulse]	0	K2640	K3140	Double word
	[pulse]	2,147,400,040 2,147,400,047 [puise]		%KD1320	%KD1570	
	M Code	0 ~ 65,535	0	K2647	K3147	Word
	W Code	0 00,000		%KW2647	%KW3147	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K26486~87	K31486~87	Bit
	A/D No.	0.140.1, 1.140.2, 2.140.3, 3.140.4	U	%KX42374~75	%KX50374~75	Dit
	Spood	1 ~ 100 000[pulso/s]	0	K2644	K3144	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1322	%KD1572	
	Dwell	0 - 50 000[unitumo]	0	K2646	K3146	Word
	DMell	0 ~ 50,000[unit:™S]	U	%KW2646	%KW3146	vvolu

Step	Item	Softing range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K26584	K31584	
	Coord.	0 . ABO, 1 . INC	ADO	%KX42532	%KX50532	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26582~83	K31582~83	Bit
	1 attern	O. LIND, T. INELLY, Z. GOINT	LIND	%KX42530~31	%KX50530~31	
	Control	0 : POS, 1 : SPD	POS	K26581	K31581	Bit
	Control	0.1 00, 1.01 B	1 00	%KX42529	%KX50529	
	Method	0 : SIN, 1 : REP	SIN	K26580	K31580	Bit
		O. Oliv, T. INCI	Ollv	%KX42528	%KX50528	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2659	K3159	Word
62			U	%KW2659	%KW3159	
02	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2650	K3150	Double word
	[pulse]	-2,147,465,046 -2,147,465,047 [pulse]		%KD1325	%KD1575	
	M Code	0 ~ 65,535	0	K2657	K3157	\A/ = == I
	W Code	0 ~ 65,535	U	%KW2657	%KW3157	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K26586~87	K31586~87	Bit
	A/D No.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX42534~35	%KX50534~35	DIL
	Spood	1 ~ 100,000[pulse/s]	0	K2654	K3154	Double word
	Speed	1 100,000[pulse/s]	U	%KD1327	%KD1577	
	Dwell	0 ~ 50 000[unit:ms]	0	K2656	K3156	Word
	Dweii	0 ~ 50,000[unit:™S]	U	%KW2656	%KW3156	vvoiu

Ston	Itom	Softing rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K26684	K31684	
	Coord.	U. ABO, T. INC	ADO	%KX42692	%KX50692	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26682~83	K31682~83	Bit
	1 ditoiii	O. END, T. REEF, Z. GOINT	LIVE	%KX42690~91	%KX50690~91	
	Control	0 : POS, 1 : SPD	POS	K26681	K31681	Bit
	Control	0.1 00, 1.01 B	1 00	%KX42689	%KX50689	
	Method	0 : SIN, 1 : REP	SIN	K26680	K31680	Bit
		0 . Oliv, 1 . IXE1	Onv	%KX42688	%KX50688	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2669	K3169	
60				%KW2669	%KW3169	Word
63	Address	-2.147,483,648~2,147,483,647 [pulse]	0	K2660	K3160	Double word
	[pulse]	2,117,100,010 2,117,100,017 [paido]		%KD1330	%KD1580	Bouble Word
	M Code	0 ~ 65,535	0	K2667	K3167	Word
	W CCGC	0 00,000	Ŭ	%KW2667	%KW3167	Word
	A /D NI-	0. No 4. 4. No 0. 0. No 0. 0. No 4.		K26686~87	K31686~87	D:4
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	%KX42694~95	%KX50694~95	Bit
	Speed	1 - 100 000[puloo/o]	0	K2664	K3164	Double word
-	Speed	1 ~ 100,000[pulse/s]	U	%KD1332	%KD1582	
	Dwell	0 - 50 000[upit:ms]	0	K2666	K3166	Word
	Dwell	0 ~ 50,000[unit:™S]	U	%KW2666	%KW3166	vvolu

Ston	Item	Setting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K26784	K31784	
	Coord.	U.ABS, T. INC	ADO	%KX42852	%KX50852	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26782~83	K31782~83	Bit
		O. END, T. NEEL, 2. CONT	LIND	%KX42850~51	%KX50850~51	
	Control 0 : POS, 1 : SF	0 : POS, 1 : SPD	POS	K26781	K31781	
		0.1 00, 1.012	1 00	%KX42849	%KX50849	Bit
	Method	0 : SIN, 1 : REP	SIN	K26780	K31780	Bit
		O. OIIV, T. INEI	Onv	%KX42848	%KX50848	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2679	K3179	Word
64				%KW2679	%KW3179	
01	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2670	K3170	Double word
	[pulse]	2,117,100,010 2,117,100,017 [paido]	<u> </u>	%KD1335	%KD1585	Boable Word
	M Code	0 ~ 65,535	0	K2677	K3177	Word
	W CCGC	0 00,000		%KW2677	%KW3177	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K26786~87	K31786~87	Bit
	705 110.	0.110.1, 1.110.2, 2.110.0, 0.110.1		%KX42854~55	%KX50854~55	- Dit
	Speed	1 ~ 100,000[pulse/s]	0	K2674	K3174	Double word
	Speeu	1 ~ 100,000[pulse/s]	Ů	%KD1337	%KD1587	
	Dwell	0 ~ 50,000[unit: ^{ms}]	0	K2676	K3176	Word
	DWCII	0 00,000[um]		%KW2676	%KW3176	vvolu

Ston	Item	Satting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Dala Size
	Coord.	0 : ABS, 1 : INC	ABS	K26884	K31884	
	Coord.	U. ABS, T. INC	ADO	%KX43012	%KX51012	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26882~83	K31882~83	Bit
		O. LIND, T. KLLI, Z. GOINT	LIND	%KX43010~11	%KX51010~11	
	Control	0 : POS, 1 : SPD	POS	K26881	K31881	
	Control	0.503, 1.350	F03	%KX43009	%KX51009	Bit
	Method	0 : SIN, 1 : REP	SIN	K26880	K31880	- Bit
		O. OIN, T. IXEI	Ollv	%KX43008	%KX51008	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2689	K3189	Word
65			U 0	%KW2689	%KW3189	
03	Address	2 4 4 7 4 9 2 C 4 9 2 4 4 7 4 9 2 C 4 7 [m.de.a]	0	K2680	K3180	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]		%KD1340	%KD1590	
	M Code	0 ~ 65,535	0	K2687	K3187	\A/I
	W Code	0 ~ 65,555	U	%KW2687	%KW3187	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K26886~87	K31886~87	Bit
	A/D NO.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX43014~15	%KX51014~15	ы
	Speed	1 ~ 100 000[nulco/c]	0	K2684	K3184	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1342	%KD1592	
	Dwell	0 ~ 50,000[unit:ms]	0	K2686	K3186	Word
	DMell		U	%KW2686	%KW3186	vvolu

Step	Item	Sotting range	Initial	Dedicate	d K area	Data size
Step	iteiii	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K26984	K31984	
	Coord.	U. ADS, T. INC	ADS	%KX43172	%KX51172	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K26982~83	K31982~83	Bit
	1 attern	O. LIND, T. NELT, Z. GOINT	LIND	%KX43170~71	%KX51170~71	
	Control	0 : POS, 1 : SPD	POS	K26981	K31981	Bit
	Control	0.100, 1.010	1 00	%KX43169	%KX51169	
	Method	0 : SIN, 1 : REP	SIN	K26980	K31980	- Bit
		O. SIN, T. IXLI	Ollv	%KX43168	%KX51168	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2699	K3199	Word
66			U	%KW2699	%KW3199	
00	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2690	K3190	Double word
	[pulse]	-2,147,403,040 2,147,403,047 [pulse]	U	%KD1345	%KD1595	
	M Code	0 ~ 65,535	0	K2697	K3197	Word
	W Code	0 00,000	Ů	%KW2697	%KW3197	vvoid
	A/D No.	0 · No 1 1 · No 2 2 · No 2 2 · No 4	0	K26986~87	K31986~87	Bit
	A/D NO.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	U	%KX43174~75	%KX51174~75	DIL
	Spood	1 ~ 100,000[pulse/s]	0	K2694	K3194	Double word
	Speed	1 - 100,000[puise/s]	U	%KD1347	%KD1597	
	Dwell	0	0	K2696	K3196	Mord
	Dwell	0 ~ 50,000[unit:ms]	U	%KW2696	%KW3196	Word

Ston	ltom	Softing rouge	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K27084	K32084	
	Coord.	U.ABS, T. INC	ADS	%KX43332	%KX51332	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27082~83	K32082~83	
	1 attorn	O. LIND, T. INELLY, 2. GOINT	LIND	%KX43330~31	%KX51330~31	Bit
	Control	Control 0 : POS, 1 : SPD POS	POS	K27081	K32081	
	Control		%KX43329	%KX51329	Bit	
	Method	0 : SIN, 1 : REP	SIN	K27080	K32080	Bit
		O. Oliv, T. INEI	Oliv	%KX43328	%KX51328	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2709	K3209	Word
67			U	%KW2709	%KW3209	
07	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2700	K3200	Double word
	[pulse]	-2,147,465,046 -2,147,465,047 [pulse]		%KD1350	%KD1600	
	M Code	0 ~ 65,535	0	K2707	K3207	Word
	M Code	0 ~ 65,555	U	%KW2707	%KW3207	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27086~87	K32086~87	Bit
	A/D NO.	0 . NO.1, 1 . NO.2, 2 . NO.3, 3 . NO.4	U	%KX43334~35	%KX51334~35] BIT
	Speed	1 ~ 100 000[pulso/s]		K2704	K3204	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1352	%KD1602	Double word
	Dwell	0 - 50 000[unitumo]	0	K2706	K3206	Word
	Dweii	0 ~ 50,000[unit:™S]	U	%KW2706	%KW3206	vvolu

Ston	Itom	Cotting rouge	Initial	Dedicate	ed K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K27184	K32184	
	Coord.	U. ABG, T. INC	ADO	%KX43492	%KX51492	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27182~83	K32182~83	Bit
		O. LIND, T. INELLY, 2. CONT	LIND	%KX43490~91	%KX51490~91	
	Control	0 : POS, 1 : SPD	POS	K27181	K32181	
	Oontroi	0.1 00, 1.01 2	1 00	%KX43489	%KX51489	Bit
	Method	0 : SIN, 1 : REP	SIN	K27180	K32180	Bit
		O. Oliv, T. INCI	Ollv	%KX43488	%KX51488	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2719	K3219	Word
68			ļ °	%KW2719	%KW3219	
00	Address	2.447.402.640	0	K2710	K3210	Double word
	[pulse]	-2,147,483,648 ~2,147,483,647 [pulse]		%KD1355	%KD1605	
	M Code	0 ~ 65,535	0	K2717	K3217	Word
	W Code	0 ~ 65,555	U	%KW2717	%KW3217	vvord
	A/D Na	0. No. 4. 4. No. 2. 2. No. 2. 2. No. 4		K27186~87	K32186~87	D:t
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	%KX43494~95	%KX51494~95	Bit
	Spood	1 - 100 000[puloo/o]	0	K2714	K3214	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1357	%KD1607	Double word
	Dwell	0 50 000[it.mo]	0	K2716	K3216	Mord
	Dwell	0 ~ 50,000[unit:™S]	U	%KW2716	%KW3216	Word

Step	Item	Softing range	Initial	I Dedicated K area		Data size
Step	iteiii	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K27284	K32284	
	Coold.	U. ABS, T. INC	ADO	%KX43652	%KX51652	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27282~83	K32282~83	Bit
	1 ditem	O. END, T. IXELT, Z. OOM	LIND	%KX43650~51	%KX51650~51	
	Control	0 : POS, 1 : SPD	POS	K27281	K32281	
		0.100, 1.010	1 00	%KX43649	%KX51649	Bit
	Method	0 : SIN, 1 : REP	SIN	K27280	K32280	Bit
		O. SIN, T. INE	Onv	%KX43648	%KX51648	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2729	K3229	Word
69			U	%KW2729	%KW3229	
00	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2720	K3220	Double word
	[pulse]	2,147,400,040 2,147,400,047 [pulse]		%KD1360	%KD1610	
	M Code	0 ~ 65,535	0	K2727	K3227	Word
	W Oode	0 00,000	Ů	%KW2727	%KW3227	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27286~87	K32286~87	Bit
	70B 110.	0 . 140.1, 1 . 140.2, 2 . 140.0, 0 . 140.4	Ů	%KX43654~55	%KX51654~55	ы
	Speed	$1 \sim 100.000$ [nulse/s]	0	K2724	K3224	Double word
	Орсси	1 ~ 100,000[pulse/s]	U	%KD1362	%KD1612	
	Dwell	0 ~ 50.000[unit:ms]	0	K2726	K3226	Word
	DMell	0 30,000[utilit.iii0]	U	%KW2726	%KW3226	vvolu

Step	Item	Softing range	Initial	Dedicate	d K area	Data size
Step	iteiii	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K27384	K32384	
	Occid.	U. ABS, T. INC	ADS	%KX43812	%KX51812	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27382~83	K32382~83	
	i attern	U. LIND, T. RELL, 2. CONT	LIND	%KX43810~11	%KX51810~11	Bit
	Control	0 : POS, 1 : SPD	POS	K27381	K32381	
	Control	0.103, 1.310	1 03	%KX43809	%KX51809	Bit
	Method	0 : SIN, 1 : REP	SIN	K27380	K32380	Bit
	Metriod U. Silv, T. REP	U. SIIV, T. IXEI	Silv	%KX43808	%KX51808	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2739	K3239	
70			U	%KW2739	%KW3239	Word
70	Address	2 447 492 649 - 2 447 492 647 [pulpe]	0	K2730	K3230	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	U	%KD1365	%KD1615	
	M Code	0 ~ 65,535	0	K2737	K3237	Word
	W Code	0 ~ 65,535	U	%KW2737	%KW3237	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27386~87	K32386~87	Bit
	A/D NO.	0 . 110.1, 1 . 110.2, 2 . 110.3, 3 . 110.4	U	%KX43814~15	%KX51814~15	DIL
	Spood	1 - 100 000[puloo/o]	0	K2734	K3234	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1367	%KD1617	
	Dwell	0 ~ 50,000[unit:™S]	0	K2736	K3236	Word
	DMell		0	%KW2736	%KW3236	

Ston	Item	Softing range	Initial	Dedicate	d K area	Doto cizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K27484	K32484	
		0 . ABS, 1 . INC	ADO	%KX43972	%KX51972	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27482~83	K32482~83	Bit
		0. END, 1. NEEL , 2. 0011	LIND	%KX43970~71	%KX51970~71	
	Control	0: POS, 1: SPD	POS	K27481	K32481	
	Control	0.100, 1.010	1 00	%KX43969	%KX51969	Bit
	Method	0 : SIN, 1 : REP	SIN	K27480	K32480	Bit
		O. SIN, T. INEI	Onv	%KX43968	%KX51968	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2749	K3249	Word
71			U	%KW2749	%KW3249	
, ,	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2740	K3240	Double word
	[pulse]	2,147,400,040 2,147,400,047 [pulse]	Ů	%KD1370	%KD1620	
	M Code	0 ~ 65,535	0	K2747	K3247	Word
	W Oode	0 00,000	Ů	%KW2747	%KW3247	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27486~87	K32486~87	Bit
	A/D No.	0.140.1, 1.140.2, 2.140.3, 0.140.4	Ů	%KX43974~75	%KX51974~75	DIL
	Speed	$1 \sim 100.000$ [nulse/s]	0	K2744	K3244	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1372	%KD1622	
	Dwell	0 ~ 50,000[unit:™s]	0	K2746	K3246	Word
	DWell		J	%KW2746	%KW3246	vvolu

Step	Item	Softing range	Initial	Dedicate	ed K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K27584	K32584	
	Coord.	U. ABS, T. INC	ADS	%KX44132	%KX52132	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27582~83	K32582~83	
	1 attorn	O. LIND, T. INELLY, 2. GOINT	LIND	%KX44130~31	%KX52130~31	Bit
	Control	0 : POS, 1 : SPD	POS	K27581	K32581	D::
	Control	0.100, 1.010	1 00	%KX44129	%KX52129	Bit
	Method	0 : SIN, 1 : REP	SIN	K27580	K32580	Bit
		O. OIN, T. INC.	Ollv	%KX44128	%KX52128	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2759	K3259	
72			0	%KW2759	%KW3259	Word
12	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2750	K3250	Double word
	[pulse]	-2,147,465,046 2,147,465,047 [pulse]	U	%KD1375	%KD1625	
	M Code	0 ~ 65,535	0	K2757	K3257	Word
	W Code	0 * 05,555	U	%KW2757	%KW3257	vvoiu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27586~87	K32586~87	Bit
	A/D No.	0.110.1, 1.110.2, 2.110.3, 3.110.4	U	%KX44134~35	%KX52134~35	Dit
	Spood	1 ~ 100 000[pulco/c]	0	K2754	K3254	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1377	%KD1627	
	Dwell	0 ~ 50,000[unit:ms]	0	K2756	K3256	Word
	Dweii			%KW2756	%KW3256	vvoid

Ston	Item	Sotting range	Initial	Dedicate	d K area	Doto cizo
Step	itein	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K27684	K32684	
	Oddia.	U. ABO, T. INC	ADO	%KX44292	%KX52292	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27682~83	K32682~83	
	ration	O. END, T. REEF, Z. GOINT	LIVE	%KX44290~91	%KX52290~91	Bit
	Control	0 : POS, 1 : SPD	POS	K27681	K32681	ъ:
	Oontroi	7.00	1 00	%KX44289	%KX52289	Bit
	Method	0 : SIN, 1 : REP	SIN	K27680	K32680	Bit
		0.011, 1.1121	Oiit	%KX44288	%KX52288	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2769	K3269	Word
73			<u> </u>	%KW2769	%KW3269	
70	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2760	K3260	Double word
	[pulse]	2,111,100,010 2,111,100,011 [paido]		%KD1380	%KD1630	
	M Code	0 ~ 65,535	0	K2767	K3267	Word
	0040	0 00,000	Ů	%KW2767	%KW3267	.vo.u
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27686~87	K32686~87	Bit
	A/D No.	0.140.1, 1.140.2, 2.140.3, 0.140.4	U	%KX44294~95	%KX52294~95	Dit
	Speed	1 ~ 100 000[pulse/s]	0	K2764	K3264	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1382	%KD1632	Double Word
	Dwell	0 ~ 50,000[unit:ms]	0	K2766	K3266	Word
	DWell		U	%KW2766	%KW3266	vvolu

Ston	Item	Sotting range	Initial	Dedicate	d K area	Doto cizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K27784	K32784	
	00014.	U.ABS, T.ING	ADO	%KX44452	%KX52452	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27782~83	K32782~83	
	1 attern	O. LIND, T. INLLIT, 2. COINT	LIND	%KX44450~51	%KX52450~51	Bit
	Control	0 : POS, 1 : SPD	POS	K27781	K32781	5.4
	Control	0.1.00, 1.01.0	1 00	%KX44449	%KX52449	Bit
	Method	0 : SIN, 1 : REP	SIN	K27780	K32780	Bit
		0.0IIV, 1.1VLI	Onv	%KX44448	%KX52448	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2779	K3279	Word
74				%KW2779	%KW3279	
74	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2770	K3270	Double word
	[pulse]	-2,147,403,040 -2,147,403,047 [pulse]	0	%KD1385	%KD1635	
	M Code	0 ~ 65,535	0	K2777	K3277	Word
	W Code	0 ~ 05,555	U	%KW2777	%KW3277	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27786~87	K32786~87	Bit
	A/D No.	0 . No. 1, 1 . No. 2, 2 . No. 3, 3 . No. 4	U	%KX44454~55	%KX52454~55	DIL
	Chood	1 - 100 000[muloo/o]	0	K2774	K3274	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1387	%KD1637	
	Dwell	0 - 50 000[unitumo]	0	K2776	K3276	Word
	Dwell	0 ~ 50,000[unit:ms]	0	%KW2776	%KW3276	vvold

Ston	Itam	Softing range	Initial	Dedicate	d K area	Doto oizo
Step	Item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K27884	K32884	
	Coord.	0 . ABS, 1 . INC	7100	%KX44612	%KX52612	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27882~83	K32882~83	Bit
	1 attorn	O. LIND, T. INLLIT, 2. COINT	LIND	%KX44610~11	%KX52610~11	
	Control	0 : POS, 1 : SPD	POS	K27881	K32881	
	Control	0.703, 1.370	F03	%KX44609	%KX52609	Bit
	Method	0 : SIN, 1 : REP	SIN	K27880	K32880	- Bit
		0.3IN, 1.1KEI	Silv	%KX44608	%KX52608	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2789	K3289	Word
75			U	%KW2789	%KW3289	
75	Address	0.447.400.0400.447.400.047.11	0	K2780	K3280	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]		%KD1390	%KD1640	
	M Code	0 ~ 65,535	0	K2787	K3287	Word
	W Code	0 ~ 65,555	U	%KW2787	%KW3287	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27886~87	K32886~87	Bit
	A/D No.	0 . No.1, 1 . No.2, 2 . No.3, 3 . No.4	U	%KX44614~15	%KX52614~15	ы
	Spood	1 ~ 100,000[pulse/s]	0	K2784	K3284	Double word
	Speed	1 - 100,000[puise/s]	0	%KD1392	%KD1642	
	Dwell	0 50 000ftmit.mol	0	K2786	K3286	Word
	Dwell	0 ~ 50,000[unit:™S]	U	%KW2786	%KW3286	vvolu

Ston	Itom	Sotting range	Initial	Dedicate	d K area	Data size
Step	Item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K27984	K32984	
	Coord.	U.ABS, T. INC	ADS	%KX44772	%KX52772	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K27982~83	K32982~83	
	1 attern	U. LIND, T. RELL, Z. CONT	LIND	%KX44770~71	%KX52770~71	Bit
	Control	0 : POS, 1 : SPD	POS	K27981	K32981	
	Control	0.103, 1.310	1 03	%KX44769	%KX52769	Bit
	Method 0 : SIN, 1 : REP	0 · SIN 1 · REP	SIN	K27980	K32980	Bit
		O. Olly, T. INC.	Ollv	%KX44768	%KX52768	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2799	K3299	Word
76			U	%KW2799	%KW3299	
76	Address	2 147 492 649 - 2 147 492 647 [pulps]	0	K2790	K3290	Double word
	[pulse]	-2,147,483,648~2,147,483,647 [pulse]	U	%KD1395	%KD1645	
	M Code	0 ~ 65,535	0	K2797	K3297	Word
	W Code	0 ~ 00,000	U	%KW2797	%KW3297	vvoid
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K27986~87	K32986~87	Bit
	A/D No.	0 . No. 1, 1 . No. 2, 2 . No. 3, 3 . No. 4	U	%KX44774~75	%KX52774~75	DIL
	Speed	1 ~ 100 000[pulse/s]	0	K2794	K3294	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1397	%KD1647	
	Dwell	0 ~ 50,000[unit:ms]	0	K2796	K3296	Word
	DWell	0 30,000[drift]	U	%KW2796	%KW3296	vvolu

Ston	Item	Softing range	Initial	Dedicate	d K area	Doto cizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K28084	K33084	Bit
		U.ABS, T. INC	ADO	%KX44932	%KX52932	
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K28082~83	K33082~83	
	- r attom	O. END, T. KEEF, Z. CONT	LIND	%KX44930~31	%KX52930~31	Bit
	Control 0 : POS, 1 : SPD	0 : POS. 1 : SPD	POS	K28081	K33081	
		0.1 00, 1.01 B	1 00	%KX44929	%KX52929	Bit
	Method	0 : SIN, 1 : REP	SIN	K28080	K33080	Bit
		0 . OII4, 1 . IXEI	Onv	%KX44928	%KX52928	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2809	K3309	Word
77			0	%KW2809	%KW3309	
, ,	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2800	K3300	Double word
	[pulse]	2,147,400,040 2,147,400,047 [puise]		%KD1400	%KD1650	
	M Code	0 ~ 65,535	0	K2807	K3307	Word
	W Code	0 00,000	· ·	%KW2807	%KW3307	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K28086~87	K33086~87	Bit
	A/D No.	0.140.1, 1.140.2, 2.140.5, 5.140.4	U	%KX44934~35	%KX52934~35	DIL
	Speed	1 ~ 100 000[pulse/s]	0	K2804	K3304	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1402	%KD1652	
	Dwell	0 ~ 50,000[unit:ms]	0	K2806	K3306	Word
	DWell	o oo,oooluintoj	U	%KW2806	%KW3306	vvolu

Ston	Item	Sotting range	Initial	Dedicate	d K area	Data size
Step	iteiii	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K28184	K33184	
	Occid.	U. ABG, T. INC	ADO	%KX45092	%KX53092	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K28182~83	K33182~83	
	i attern	U. LIND, T. INELT, Z. GOINT	LIND	%KX45090~91	%KX53090~91	Bit
	Control	0 : POS, 1 : SPD	POS	K28181	K33181	
	Control	0.1 00, 1.01 5	1 00	%KX45089	%KX53089	Bit
	Method	0 : SIN, 1 : REP	SIN	K28180	K33180	Bit
		U. SIIV, T. IVEI	SIN	%KX45088	%KX53088	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2819	K3319	Word
78			0	%KW2819	%KW3319	
70	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2810	K3310	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [puise]	0	%KD1405	%KD1655	
	M Code	0 ~ 65,535	0	K2817	K3317	Word
	W Oode	0 00,000	0	%KW2817	%KW3317	vvolu
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K28186~87	K33186~87	Bit
	A/D NO.	0 . No. 1, 1 . No. 2, 2 . No. 3, 3 . No. 4	U	%KX45094~95	%KX53094~95	Dit
	Cnood	1 - 100 000[puloo/o]	0	K2814	K3314	Double word
	Speed	1 ~ 100,000[pulse/s]	U	%KD1407	%KD1657	
	Dwell	0 F0 000[::::it.mo]	0	K2816	K3316	Word
	DWell	0 ~ 50,000[unit:ms]	U	%KW2816	%KW3316	vvolu

Ston	Item	Sotting range	Initial	Dedicate	d K area	Data sizo
Step	item	Setting range	value	X axis	Y axis	Data size
	Coord.	0 : ABS, 1 : INC	ABS	K28284	K33284	
		U. ABO, T. INC	ADO	%KX45252	%KX53252	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K28282~83	K33282~83	
	1 dttoili	O. END, T. REET, Z. OORT	LIND	%KX45250~51	%KX53250~51	Bit
	Control 0 : POS, 1 : SPD POS	0 · POS 1 · SPD	POS -	K28281	K33281	
		1 03	%KX45249	%KX53249	Bit	
	Method	0 : SIN, 1 : REP	SIN	K28280	K33280	- Bit
		O. OIN, T. INCI	Oliv	%KX45248	%KX53248	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2829	K3329	Word
79			U	%KW2829	%KW3329	
19	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2820	K3320	Double word
	[pulse]	-2,147,400,040 2,147,400,047 [pulse]	Ů	%KD1410	%KD1660	
	M Code	0 ~ 65.535	0	K2827	K3327	Word
	W Code	0 ~ 00,000	U	%KW2827	%KW3327	
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K28286~87	K33286~87	Bit
	A/D No.	0 . 110.1, 1 . 110.2, 2 . 110.3, 3 . 110.4	U	%KX45254~55	%KX53254~55	BIL
	Speed	1 ~ 100 000[pulco/c]	0	K2824	K3324	Double word
	Speeu	1 ~ 100,000[pulse/s]	0	%KD1412	%KD1662	
	Dwell	0 ~ 50,000[unit:ms]	0	K2826	K3326	Word
	Dwell	0 · 30,000[utilit.iii]	U	%KW2826	%KW3326	vvoid

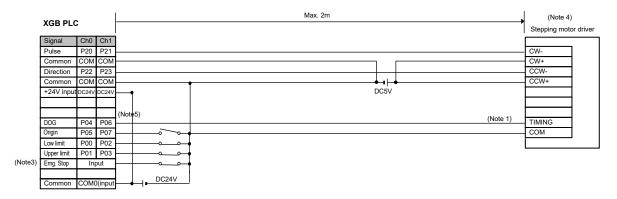
Ston	Item	Sotting range	Initial	Dedicate	d K area	Data size
Step	item	Setting range	value	X axis	Y axis	Data Size
	Coord.	0 : ABS, 1 : INC	ABS	K28384	K33384	
	Coord.	0 . ABS, 1 . INC	ADO	%KX45412	%KX53412	Bit
	Pattern	0 : END, 1 : KEEP, 2 : CONT	END	K28382~83	K33382~83	5
	1 attern	O. LIND, T. INELT, 2. CONT	LIND	%KX45410~11	%KX53410~11	Bit
	Control	0 : POS, 1 : SPD	POS	K28381	K33381	
	Control	0.1 00, 1.01 D	1 00	%KX45409	%KX53409	Bit
	Method	0 : SIN, 1 : REP	SIN	K28380	K33380	Bit
		0.0114, 1.1KE1	Ollv	%KX45408	%KX53408	
	REP Step	0 ~ 30 (0 ~ 80 for high - end)	0	K2839	K3339	Word
80				%KW2839	%KW3339	
00	Address	-2,147,483,648~2,147,483,647 [pulse]	0	K2830	K3330	Double word
	[pulse]	2,147,400,040 2,147,400,047 [puise]		%KD1415	%KD1665	
	M Code	0 ~ 65,535	0	K2837	K3337	Word
	W Code	0 00,000		%KW2837	%KW3337	Word
	A/D No.	0 : No.1, 1 : No.2, 2 : No.3, 3 : No.4	0	K28386~87	K33386~87	Bit
	700110.	0.140.1, 1.140.2, 2.140.0, 0.140.4		%KX45414~15	%KX53414~15	DIL
	Speed	$1 \sim 100000$ [pulse/s]	0	K2834	K3334	Double word
	Speed	1 ~ 100,000[pulse/s]	0	%KD1417	%KD1667	
	Dwell	0 ~ 50,000[unit:ms]	0	K2836	K3336	Word
	DWell			%KW2836	%KW3336	vvoid

Appendix 3 Motor Wiring Example

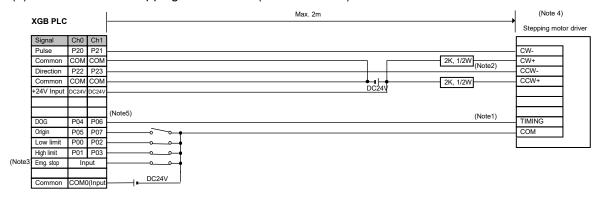
Appendix 3.1 Stepping Motor Wiring Example

Here describes wiring example between XGB and stepping motor. In case of using stepping motor not described here, refer to relevant driver's user manual.

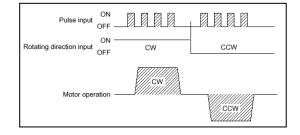
(1) Connection to a stepping motor driver (DC5V Power)



(2) Connection to a stepping motor driver (DC24V Power)



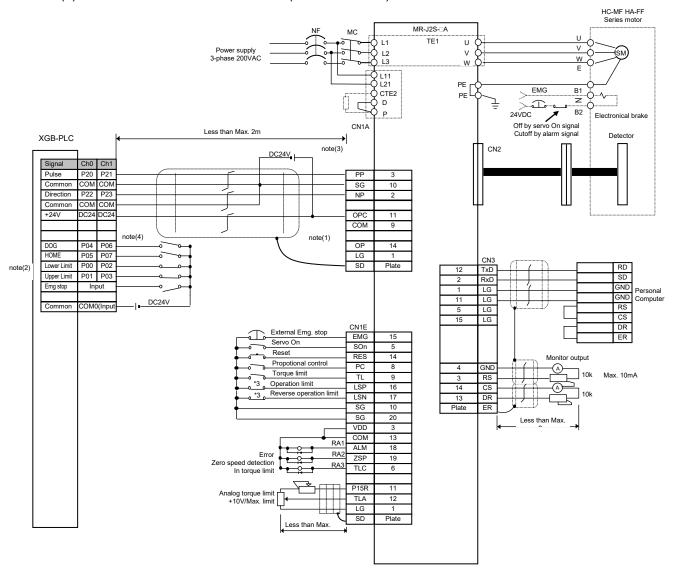
- (Note1) In case of VEXTA PKD, timing output is on every time a motor rotates 7.2 degrees. For precise home return, timing output and origin sensor should be structured by AND circuit. Depending on a system's features, it is recommended to use **home return only by DOG signal or origin sensor by origin signal** (XGB origin input rating is DC 24V).
- (Note2) Connect resistors suitable for the driver in series if DC24V is used.
- (Note3) Although origin, DOC, upper/lower limit signals are with fixed contact, it may be used for general input if they are not used. Emergency stop is available by the command (EMG).
- (Note4) In case of XGB standard type, since only pulse + direction mode is available, change input mode of stepping motor driver to 1 phase input mode.
- (Note 5) The above figure is example of XGB standard type. For high-end type, Origin, DOG, upper/lower limit input contact point is different with standard type.



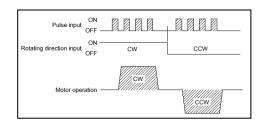
Appendix 3.2 Servo Motor Wiring Example

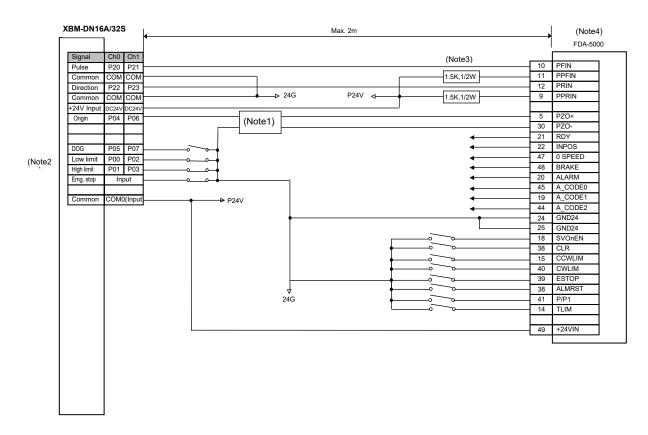
Here describes wiring example between XGB and servo motor. In case of using servo motor not described here, refer to relevant driver's user manual.

(1) Connection to a servo motor driver (MR-J2/J2S-□A)



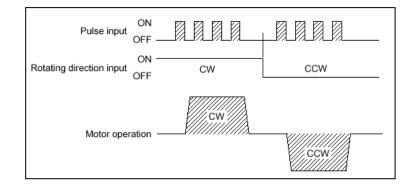
- (Note1) The rating of XGB origin input is DC24V. Make sure to connect the open collector output of a driver.
- (Note2) Although origin, DOC, upper/lower limit signals are with fixed contact, it may be used for general input if they are not used. Emergency stop is available by the command (EMG).
- (Note3) In case of XGB standard type, since only pulse + direction mode is available, change input mode of servo motor driver to 1 phase input mode.
- (Note4) The above figure is example of XGB standard type. For high-end type, Origin, DOG, upper/lower limit input contact point is different with standard type.



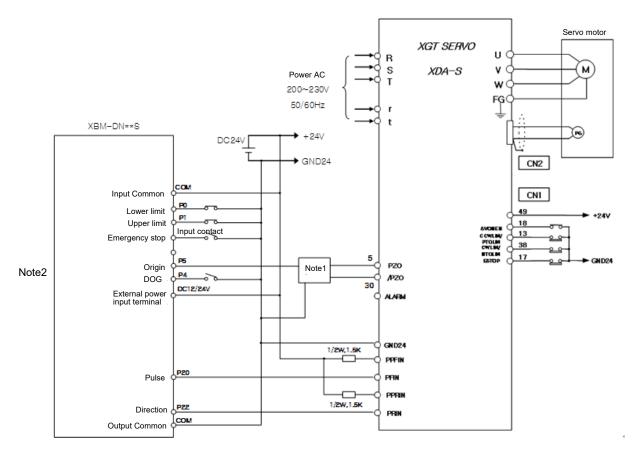


(2) Connection to a servo motor driver (FDA-5000 AC Servo Driver)

- (Note1) The rating of XGB is 24VDC. If it is line driver output, contact is not connected. In the case, use a convert from line driver output to open collector output or use home return only by DOG signal/origin sensor of origin signal.
- (Note2) Although origin, DOC, upper/lower limit signals are with fixed contact, it may be used for general input if they are not used. Emergency stop is available by the command (EMG).
- (Note3) If using DC24V, make sure to connect resistor suitable for a driver (1.5K,1/2W) in series.
- (Note4) Since the positioning pulse of XGB forward/reverse-rotates by the rotation direction as in the below figure, make sure to change the input mode of a servo motor driver into 1 phase input mode prior to use.

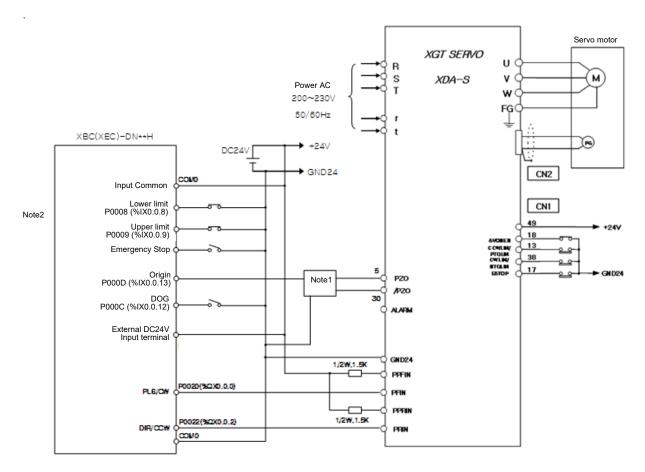


- (3) Connection to a servo motor driver (XGT Servo XDA-S)
- (a) In case of XBM-DN**S



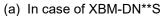
- (Note1) The rating of Origin input for XGB stand type is 24VDC. If it is line driver output, contact can't be connected. In the case, use a convert from line driver output to open collector output or use home return only by DOG signal/origin sensor of origin signal.
- (Note2) Although origin, DOC, upper/lower limit signals are with fixed contact, it may be used for general input if they are not used. Emergency stop is available by the command (EMG).
- (Note3) The above wiring is applied when P07-01=27(positioning mode)
- (Note4) Since only pulse + direction mode is available for XGB standard type, make sure to change the input mode of a servo motor driver into pulse + direction mode prior to use
- (Note5) In the above wiring, Axis X of XGB standard built-in positioning is used.

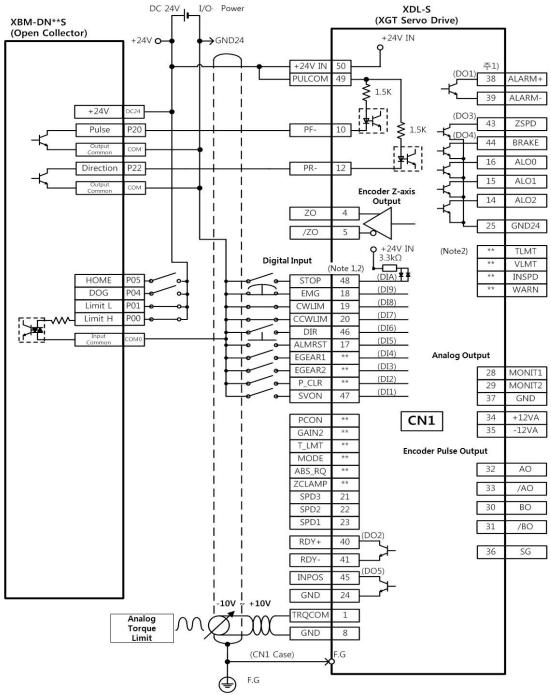
(b) In case of XBC/XEC-DN**H



- (Note1) The rating of Origin input for XGB stand type is 24VDC. If it is line driver output, contact can't be connected. In the case, use a convert from line driver output to open collector output or use home return only by DOG signal/origin sensor of origin signal.
- (Note2) Although origin, DOC, upper/lower limit signals are with fixed contact, it may be used for general input if they are not used. Emergency stop is available by the command (EMG).
- (Note3) The above wiring is applied when P07-01=27(positioning mode)
- (Note4) Since pulse + direction mode and CW/CCW mode are available for XGB high-end type, make sure to change the input mode of a servo motor driver according to output mode of positioning module
- (Note5) In the above wiring, Axis X of XGB high-end type built-in positioning is used.

(4) Connection to a servo motor driver (XGT Servo XDL-S)

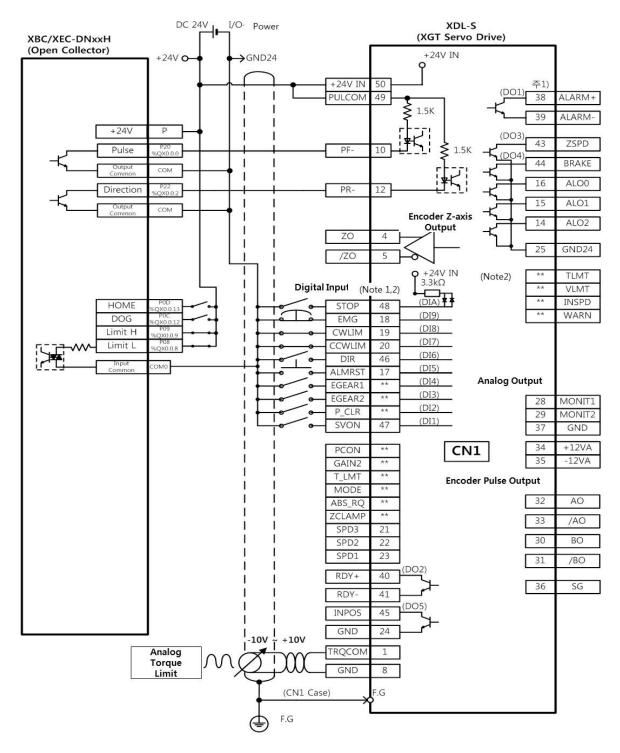




* This picture is based on 1-axis. For more information about 2-axis wiring, refer to pin information.

(Note1) Input Signal DI1~DIA, Output Signal DO1~DO5 is assigned initial signal from factory shipment (Note2) ** Not assigned Signal. Allocation can be changed by setting servo parameter

(b) In case of XBC/XEC-DN**H

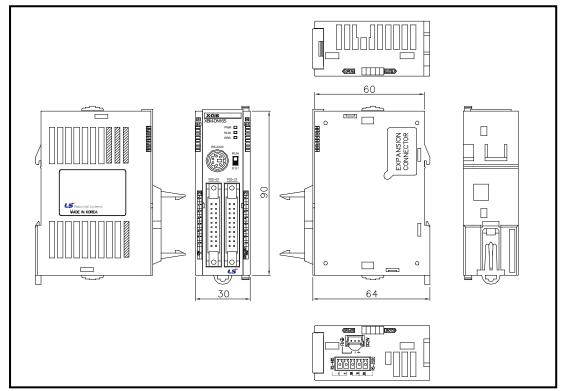


*This picture is based on 1-axis. For more information about 2-axis wiring, refer to pin information.

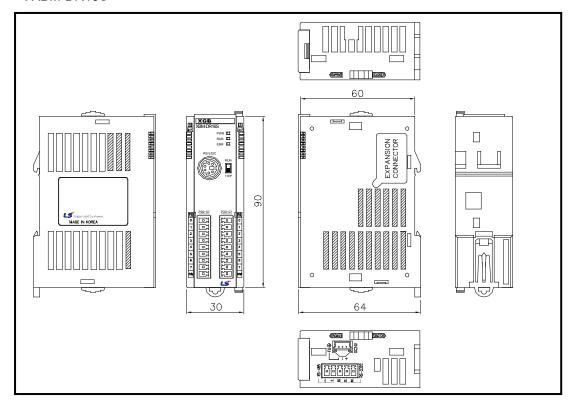
(Note1) Input Signal DI1~DIA, Output Signal DO1~DO5 is assigned initial signal from factory shipment (Note2) ** Not assigned Signal. Allocation can be changed by setting servo parameter

Appendix 4 Dimension (Unit: mm)

- (1) Modular type main unit
 - -. XBM-DN16S/32S

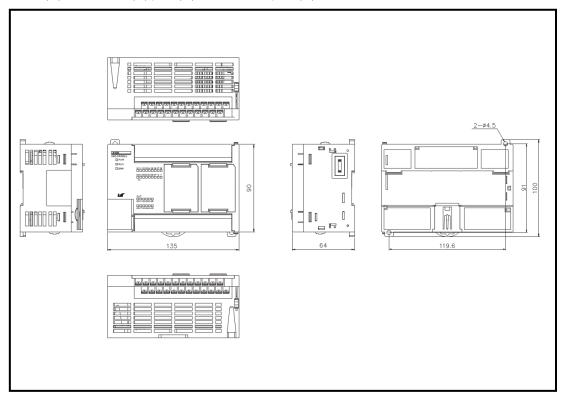


-. XBM-DR16S

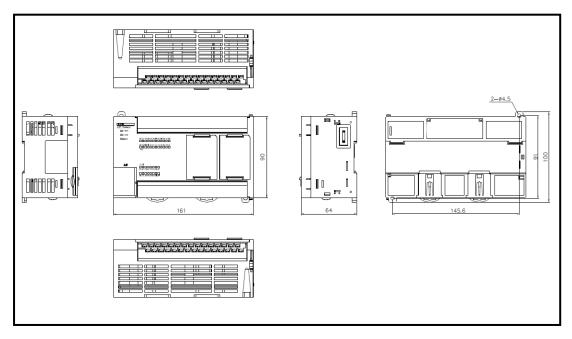


(2) Compact Standard main unit ("S(U)"type)

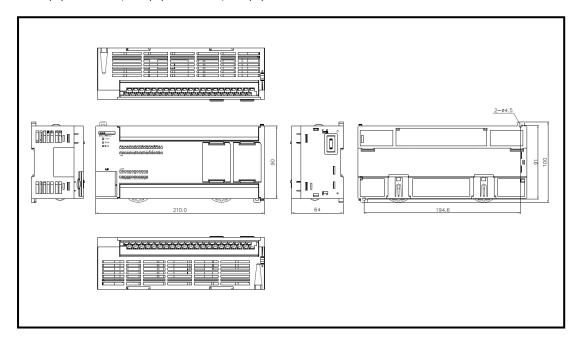
- XB(E)C-DR20/30S(U), XB(E)C-DN20/30SU, XB(E)C-DP20/30SU



-. XB(E)C-DR40SU, XB(E)C-DN40SU, XB(E)C-DP40SU

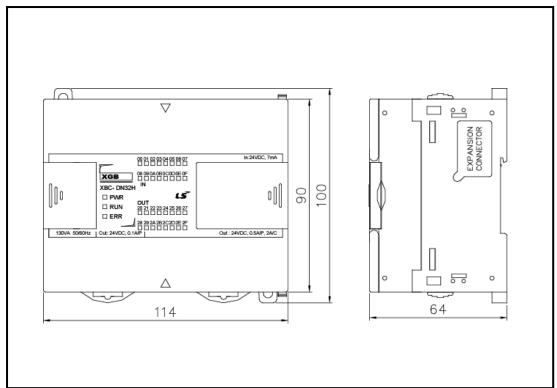


-. XB(E)C-DR60SU, XB(E)C-DN60SU, XB(E)C-DP60SU

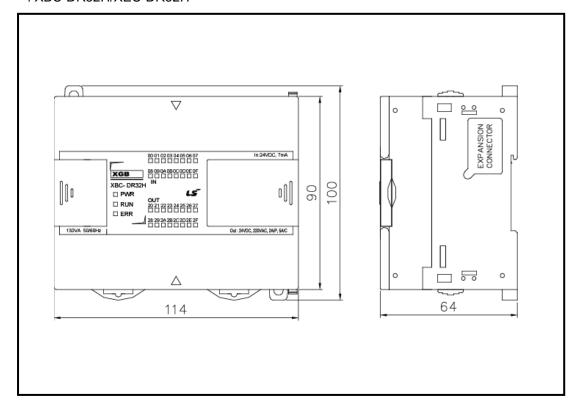


(3) Compact High-end type main unit

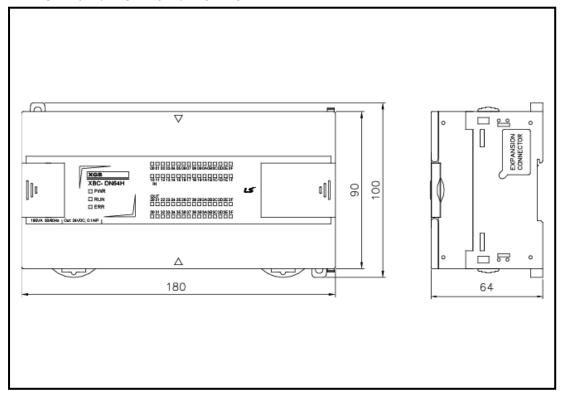
-. XBC-DN32H/XEC-DN32H/XEC-DP32H



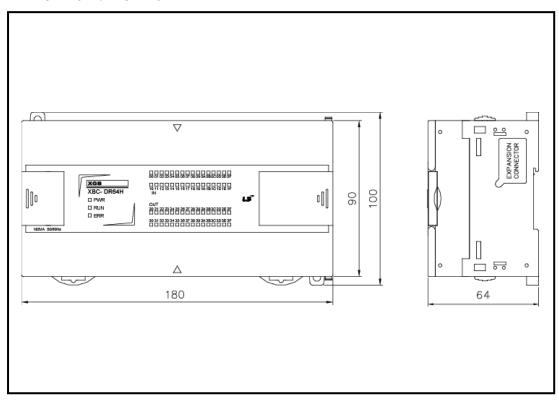
-. XBC-DR32H/XEC-DR32H



-. XBC-DN64H/XEC-DN64H/XEC-DP64H

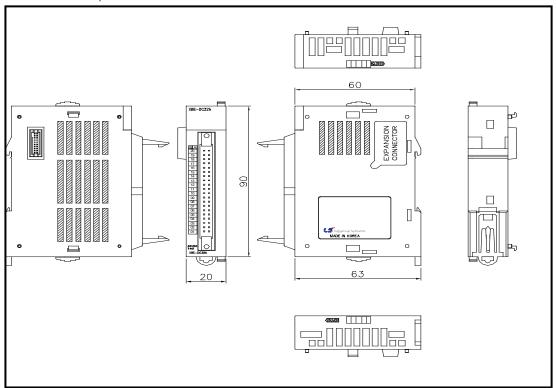


-. XBC-DR64H/XEC-DR64H

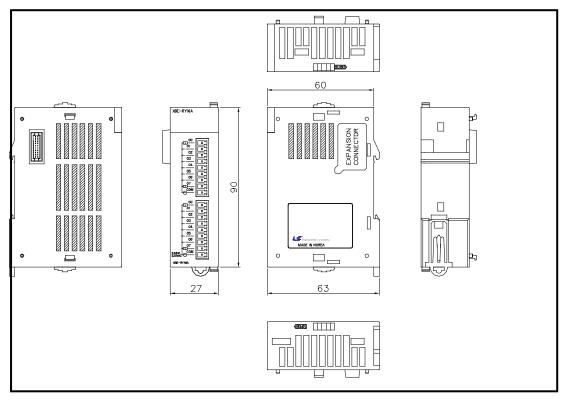


(4) Extended I/O module

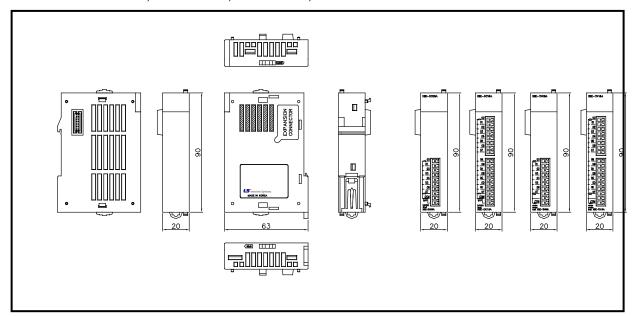
-. XBE-DC32A, XBE-TR32A



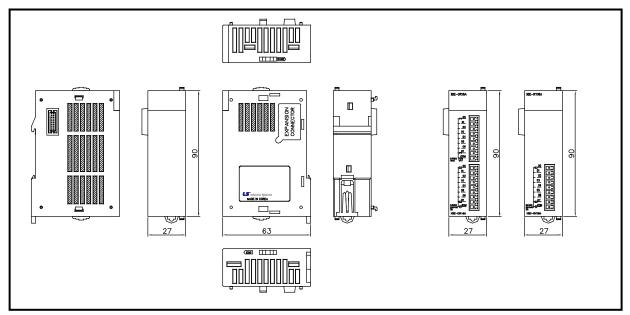
-. XBE-RY16A



-. XBE-DC08A, XBE-DC16A, XBE-TN08A, XBE-TN16A

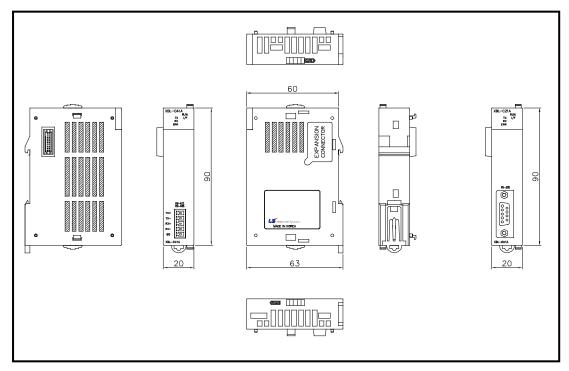


-. XBE-DR16A, XBE-RY08A

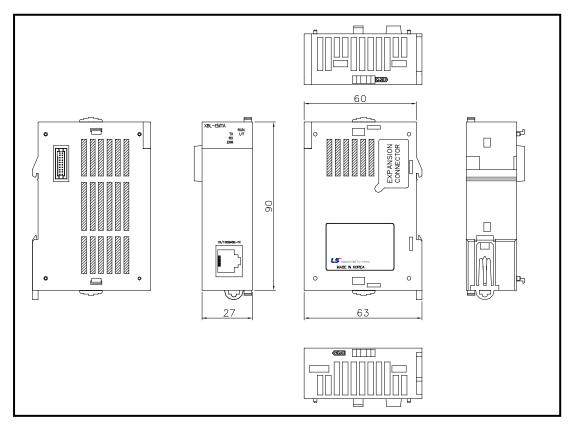


(5) Communication module

-. XBL-C41/21A

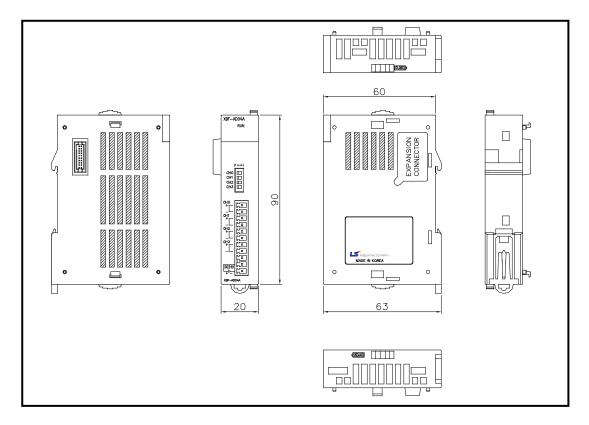


-. XBL-EMTA

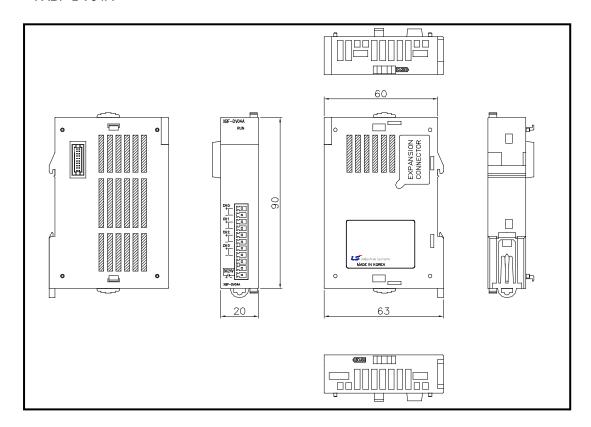


(5) Special module

-. XBF-AD04A



-. XBF-DV04A



APP4-1 0

Warranty

1. Warranty Period

The product you purchased is guaranteed for 36 months from the date of manufacture.

2. Scope of Warranty

- (1) The initial diagnosis of faults is basically conducted by your company. However, upon your request, our company or our service network can undertake this task for a fee. If the cause of the fault lies with our company, this service will be provided free of charge.
- (2) This warranty only applies if the product is used under normal conditions according to the specifications and precautions described in the handling instructions, user manuals, catalogs, and caution labels.
- (3) Even within the free warranty period, the following cases will be subject to paid repairs:
 - 1) Replacement of consumable and life-limited parts (e.g., relays, fuses, electrolytic capacitors, fans, LCDs, batteries, etc.)
 - 2) Failures or damages caused by improper storage, handling, negligence, or accidents by the customer
 - 3) Failures resulting from the customer's hardware or software design
 - 4) Failures due to modifications without our consent (Repairs will be refused, even for a fee, if recognized as modified or repaired outside our company)
 - 5) Failures that could have been avoided if the customer's equipment, in which our product is incorporated, had safety devices required by legal regulations or common industry standards
 - 6) Failures that could have been prevented if maintenance and replacement of consumable parts were performed normally according to the handling instructions or user manuals
 - 7) Failures and damages to the product caused by using connected equipment or inappropriate consumables
 - 8) Failures caused by external factors such as fire, abnormal voltage, force majeure, and natural disasters such as earthquakes, lightning, salt damage, wind, and flood damage
 - 9) Failures due to reasons that could not be predicted with the scientific and technical standards at the time of our shipment
 - 10) Other failures, damages, or defects recognized as the responsibility of your company

Environmental Policy

LS ELECTRIC Co., Ltd supports and observes the environmental policy as below.

Environmental Management LS ELECTRIC considers the environmental preservation as the preferential management subject and every staff of LS ELECTRIC use the reasonable endeavors for the pleasurably environmental preservation of the earth. About Disposal LS ELECTRIC PLC unit is designed to protect the environment. For the disposal, separate aluminum, iron and synthetic resin (cover) from the product as they are reusable.



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