Ezi-STEP® II CC-Link

Micro Stepping System

- User Manual -

※ Before Operation ※

- Thank you for your purchasing the FASTECH's Ezi-STEPII CC-Link product.
- Ezi-STEPII CC-Link products include the standard drive Ezi-STEPII CC-Link ST and large capacity drive Ezi-STEPII CC-Link 86.
- When both types are common, this manual describes as **Ezi-STEPII CC-Link**.
- Ezi-STEPII CC-Link is a product that Ezi-STEPII product is directly connected to CC-Link network and can use motion, parameter, PT operation, teaching etc.
- This manual describes handling, maintenance, repairing, diagnosis and troubleshooting of Ezi-STEPII CC-Link.
- Before operating Ezi-STEPII CC-Link, thoroughly read this manual for safety.
- After reading this manual, please keep this manual near Ezi-STEPII CC-Link, so that any user can read the manual whenever needed.

- Contents -

1. Precautions

1.1 General Precautions

- Contents of this manual are subjected to change without prior notice for functional improvement, change of specifications or user's better understanding.
- When the manual is damaged or lost, please contact with FASTECH's agents or our company at the address on the last page of the manual.
- Our company is not responsible for a product breakdown due to user's dismantling for the product, and such a breakdown is not guaranteed by the warranty.

1.2 Safety Precaution

- Before installation, operation and repairing the Ezi-STEPII CC-Link, thoroughly read the manual and fully understand the contents. Before operating the Ezi-STEPII CC-Link please fully understand the mechanical characteristics of the product, related safety information and precautions.
- This manual is divided safety precautions into **Attention** and **Warning**.

Reference	Additional instructions on how to view the notations in the manual or function examples.
Attention	If user does not properly handle the product, the user may get seriously or slightly injured and damages may occur in the machine.
Warning	Improper handling may result in electric shock or other dangerous situations and may result in death or serious injury.

- Although precaution is only an Attention, a serious result could be caused depending on the situation. Please follow safety precautions.

1.3 Product Status

⚠ **Attention**	Check whether the Product is damaged, or parts are missing. Otherwise, the machine may get damaged, or the user may get injured.

1.4 Installation

⚠ **Attention**	Please carry the Ezi-STEPII CC-Link carefully. Otherwise, the product may get damaged or user's foot may get injured by dropping the product. Use non-flammable materials such as metal in the place where the Ezi-STEPII CC-Link is to be installed. Otherwise, a fire may occur. When installing several Ezi-STEPII CC-Link products in a sealed place, install a cooling fan to keep the ambient temperature of the product as 55℃ or lower. Otherwise, a fire or other kinds of accidents may occur due to overheating.
⚠ **Warning**	The process of Installation, Connection, Operation, Checking and Repairing should be done by qualified person. Otherwise, a fire or other kinds of accidents may occur.

1.5 Wiring

⚠ **Attention**	Keep the rated range of input Voltage for Ezi-STEPII CC-Link drive. Otherwise, a fire or other kinds of accidents may occur. Cable connection should be following the wiring diagram. Otherwise, a fire or malfunction of machine may occur.
⚠ **Warning**	Before connecting cables, check if input power is off. Otherwise, an electric shock or a fire may occur. The case of this Ezi-STEPII CC-Link is installed from the ground of the internal circuit by the condenser, please ground the Ezi-STEPII CC-Link. Otherwise, an electric shock or a file may occur and a cause of malfunction of machine.

1.6 Operation & Setting Change

 **Attention**	If a protection function (Alarm) occurs, firstly remove its cause and then release (Alarm reset) the protection function. If you operate continuously without removing its cause, the machine may get damaged or the user may get injured. Make all input signals to OFF before supply input voltage to Ezi-STEPII CC-Link drive. The machine may get damaged or the user may get injured by motor operation. All parameter values are set by default factory setting value. Change this value after reading this manual thoroughly. Otherwise, the machine may get damaged or other kinds of accidents may occur.

1.7 Check & Repair

 **Warning**	Stop to supply power to the main circuit and wait sufficient time before checking or repairing this Ezi-STEPII CC-Link. Electricity remaining in the condenser may cause of electric shock. Do not change cabling while power is being supplied. Otherwise, the user may get injured or the product and machine may get damaged. Do not reconstruct the Ezi-STEPII CC-Link. Otherwise, an electric shock may occur or the product and machine get damaged. And the reconstructed product cannot get after service.

Note on Installation

1) This product has been designed for indoor uses. The ambient temperature of the room should be 0°~ 55°C.
2) If the temperature of the case is 50°C or higher, radiate heat outside for cooling down.
3) Do not install this product under direct rays or near magnetic or radioactive objects.
4) If more than 2 drives are installed in a line, keep the interval of 20mm or more vertically and 50mm or more horizontally at least.

2. Specifications of the Product

2.1 Product Overview

Ezi-STEPII CC-Link is a product that can drive the step motor of FASTECH in CC-Link network which is high-speed field-network.

By connecting to the network with CC-Link 1.0 Remote Device, it is possible to control through 1 station and 2 station occupation mode, and the allocation area of device memory of host controller can be optimized according to the operation status.

When using station 1 occupation mode, speed or position can be adjusted by jog operation or step-jog operation. User can use the position adjusted by jog operation or step-jog operation, or you can configure the position information input to the remote register (Remote Resister) by position table (PT).

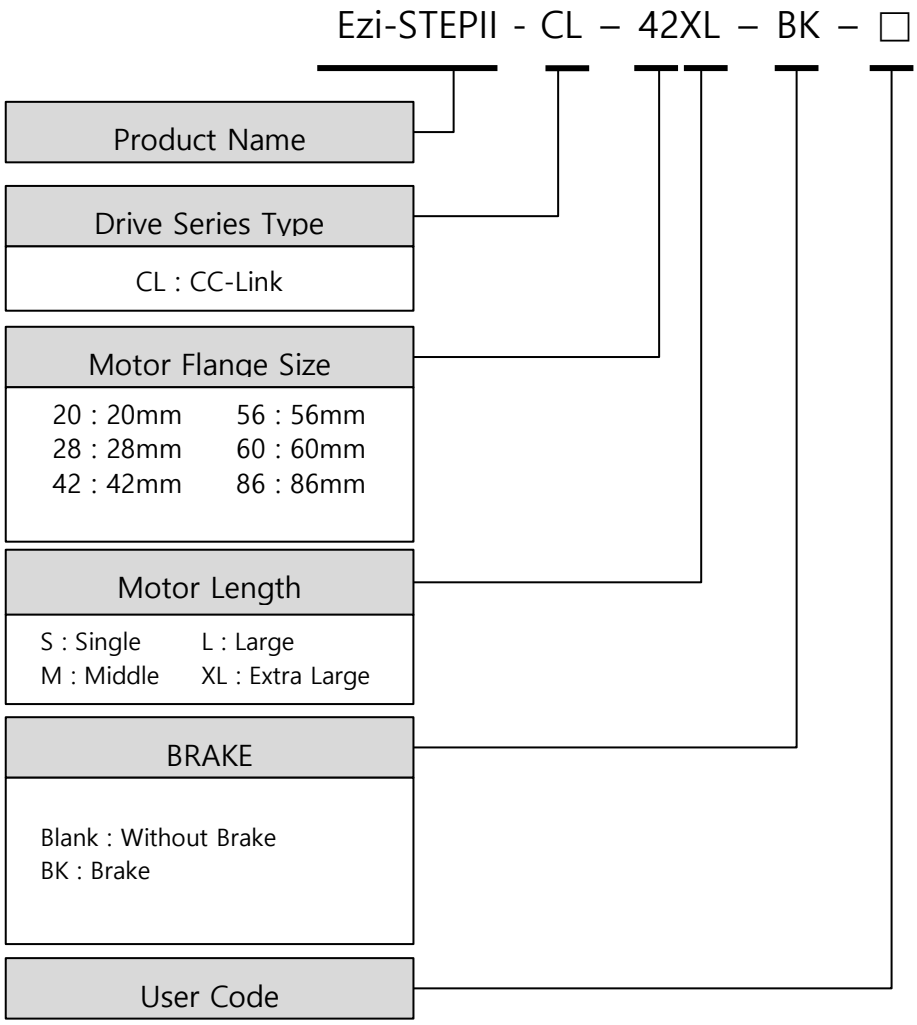
The 2-station occupied mode includes the function of the occupied mode of station 1 and includes the position move command, direct external I/O control command. In addition, by allocating more remote registers, status data can be checked at any time.

2.2 Specifications of the Drive

Network		CC-Link Ver.1	
Drive Type		Ezi-STEPII CC-Link ST	Ezi-STEPII CC-Link 86
Input Voltage		24VDC ±10%	40~70VDC ±10%
Control Method		Closed loop control with ARM-based 32-bit MCU	
Station Information		Connection to remote device station, 1 ~ 2 Station Occupation	
Current Consumption		Drive: Max. 0.5[A] Motor: Max. 4[A]	
Operating condition	Ambient Temperature	In Use : 0~55℃ In Storage : -27~70℃	
	Humidity	In Use : 35~85%RH (Non-Condensing) In Storage : -10~90%RH (Non-condensing)	
	Vibration resist	0.5G	
Function	Rotation Speed	0 ~ 3,000 rpm	
	Resolution[ppr]	500, 1000, 1600, 2000, 3200, 3600, 4000, 5000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000 [ppr] (Selected by Parameter)	
	Protection Function	Over current, Over Speed, Over temperature, Over regenerated voltage, Motor connection error, ROM error	
	LED Display	Power status, Running status, Motor excitation Status, Alarm status, CC-Link Network status	
I/O signal	Input Signal	3 dedicated input (Limit+, Limit-, Origin) 7 programmable input (User mapping)	
	Output Signal	1 dedicated output (DC24V Brake) 6 programmable output (User mapping)	

2.3 Configuration of the Product

2.3.1 Part Numbering

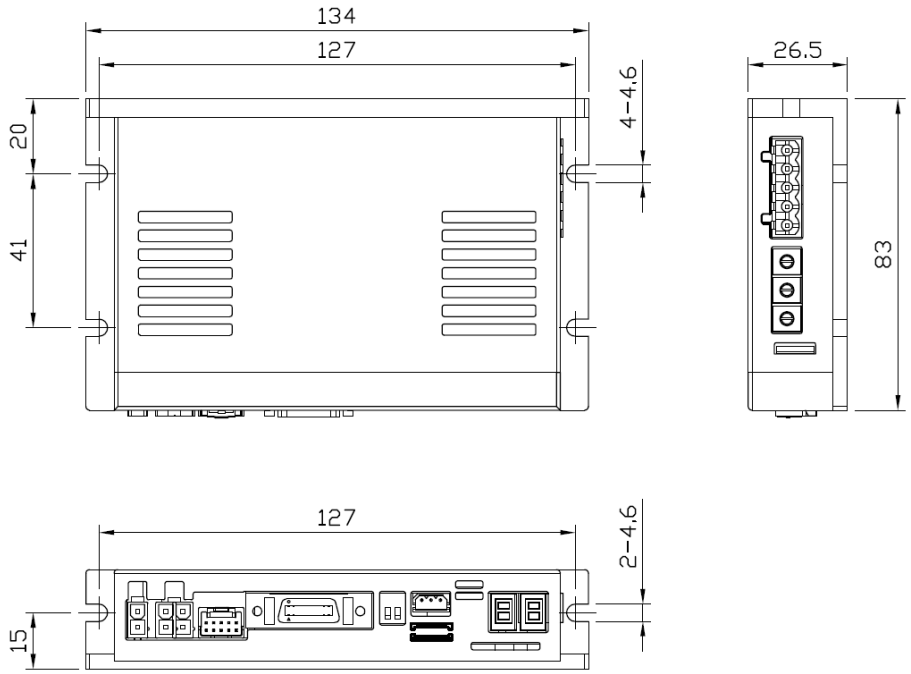


2.3.2 Product combination

Unit Part Numbering	Motor Model Number	Drive Model Number
Ezi-STEPII-CL-20M	BM-20M	EzT2-CL-20M
Ezi-STEPII-CL-20L	BM-20L	EzT2-CL-20L
Ezi-STEPII-CL-28S	BM-28S	EzT2-CL-28S
Ezi-STEPII-CL-28M	BM-28M	EzT2-CL-28M
Ezi-STEPII-CL-28L	BM-28L	EzT2-CL-28L
Ezi-STEPII-CL-42S	BM-42S	EzT2-CL-42S
Ezi-STEPII-CL-42M	BM-42M	EzT2-CL-42M
Ezi-STEPII-CL-42L	BM-42L	EzT2-CL-42L
Ezi-STEPII-CL-42L	BM-42L	EzT2-CL-42L
Ezi-STEPII-CL-42XL	BM-42XL	EzT2-CL-42XL
Ezi-STEPII-CL-56S	BM-56S	EzT2-CL-56S
Ezi-STEPII-CL-56M	BM-56M	EzT2-CL-56M
Ezi-STEPII-CL-56L	BM-56L	EzT2-CL-56L
Ezi-STEPII-CL-60S	BM-60S	EzT2-CL-60S
Ezi-STEPII-CL-60M	BM-60M	EzT2-CL-60M
Ezi-STEPII-CL-60L	BM-60L	EzT2-CL-60L
Ezi-STEPII-CL-86M	BM-86M	EzT2-CL-86M
Ezi-STEPII-CL-86L	BM-86L	EzT2-CL-86L
Ezi-STEPII-CL-86XL	BM-86XL	EzT2-CL-86XL

2.4 Dimensions

2.4.1 Ezi-STEPII CC-Link ST



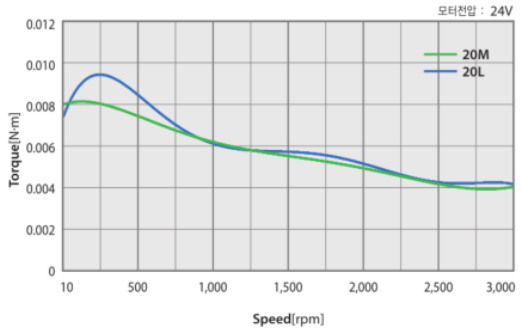
2.5 Specifications of the Motor

2.5.1 Motor Specifications

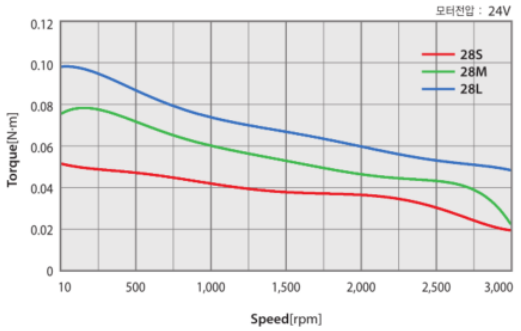
Motor	Current per Phase	Holding Torque	Rotor Inertia	Weight	Length
Unit	A	N·m	g·㎠	g	mm
BM-20M	0.5	0.016	2.5	50	28
BM-20L	0.5	0.025	3.3	80	38
BM-28S	0.95	0.69	9	110	32
BM-28M	0.95	0.10	13	140	45
BM-28L	0.95	0.12	18	200	50
BM-42S	1.2	0.32	35	250	34
BM-42M	1.2	0.44	54	280	40
BM-42L	1.2	0.5	77	350	48
BM-42XL	1.2	0.65	114	500	60
BM-56S	3	0.64	180	500	46
BM-56M	3	1.00	280	720	55
BM-56L	3	1.5	520	1150	80
BM-60S	4	0.88	240	600	47
BM-60M	4	1.28	490	1000	56
BM-60L	4	2.4	690	1300	85
BM-86M	6	4.5	1800	2.3	78
BM-86L	6	8.5	3600	3.8	117
BM-86XL	6	12	5400	5.3	155

2.5.2 Characteristics of the Motor Torque

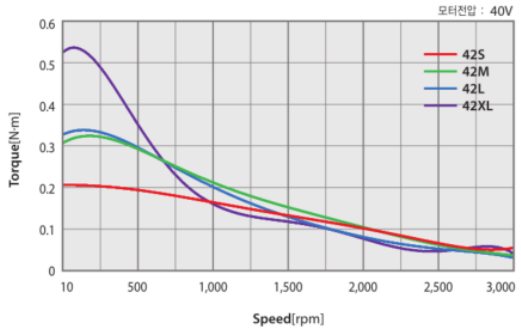
Ezi-STEP II-CL-20 series



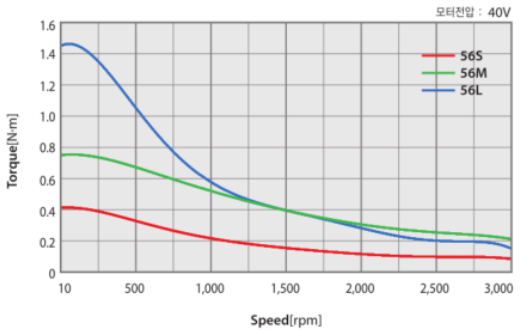
Ezi-STEP II-CL-28 series



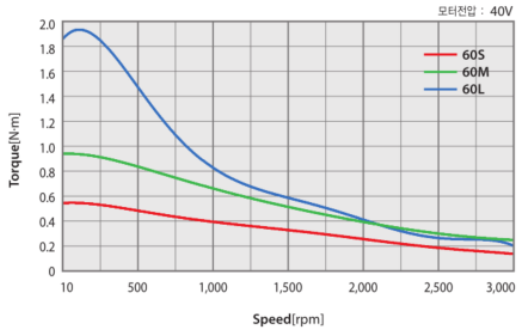
Ezi-STEP II-CL-42 series



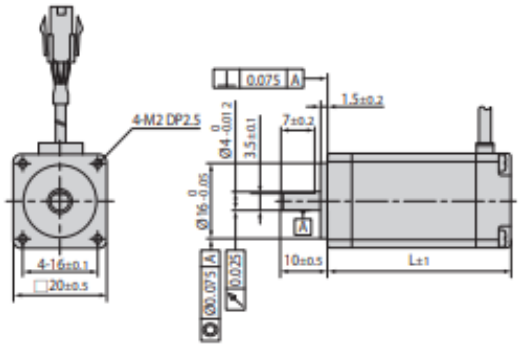
Ezi-STEP II-CL-56 series



Ezi-STEP II-CL-60 series

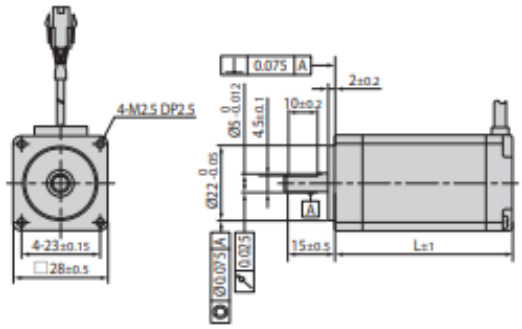


2.5.3 Motor Size



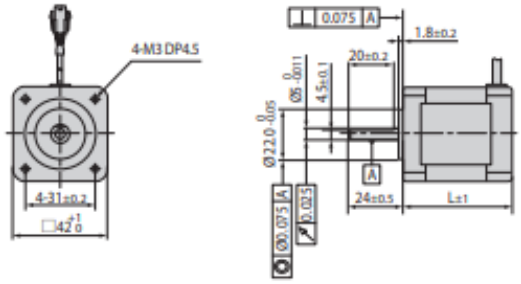
20mm

Model name	Length(L)
BM-20M	28
BM-20L	38



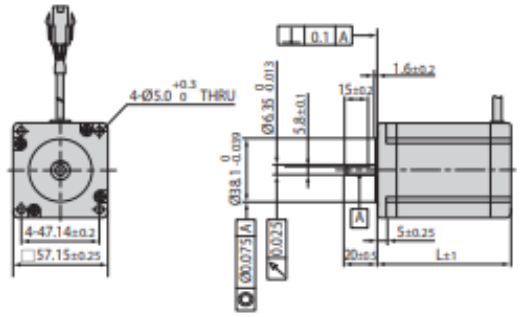
28mm

Model name	Length(L)
BM-28S	32
BM-28M	45
BM-28L	50



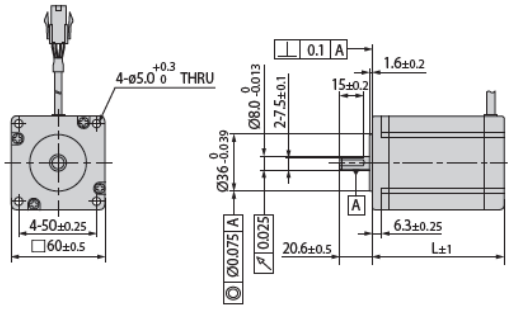
42mm

Model name	Length(L)
BM-42S	34
BM-42M	40
BM-42L	48
BM-42XL	60



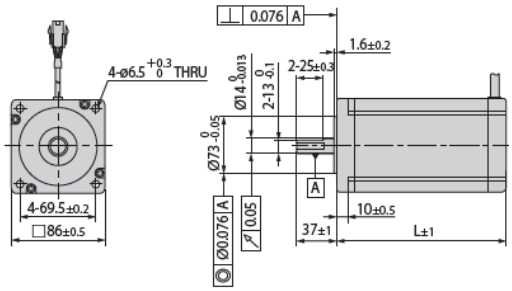
56mm

Model name	Length(L)
BM-56S	46
BM-56M	55
BM-56L	80



60mm

Model Name	Length(L)
BM-60S	47
BM-60M	56
BM-60L	85



86mm

Model Name	Length(L)
BM-86M	78
BM-86L	117
BM-86XL	155

Refer to "10. Appendix" or catalog in this manual for brake-mounted motors.

3. Function and Configuration

3.1 CC-Link Overview

CC-Link is an industrial network configured with an RS485 topology. This network is one of the field buses with high-speed / on-time capability and supports communication speeds of up to 10 Mbps. And it is a network that guarantees the regularity of data by supporting the cyclic transmission function for always the same link scan processing.

These features make it possible to process large volumes of data at high speed and enable rapid connection of on-site information to improve productivity. The RS485 topology simplifies installation and maintenance.

Item	Specification
Max. Link point number	Ver 1.1 : Remote I/O (RX,RY) - 2048 Bit, Remote resister (RWr, RWw) 512 WORD Ver 2.0 : Remote I/O (RX,RY) - 8192bit, Remote Resister (RWr, RWw) 2048 WORD 1) Ezi-STEPII CC-Link is CC-Link Ver. 1.1 connection is possible. 2) Even if the CC-Link master card (QJ61BT11N) of the PLC is set to Remote Net 2.0 mode, the station type is can be set to Ver.1.
Max. Point/ 1Station	Remote I/O : 32 points each , Remote resister 8 WORD
Max. occupied station	4 Station occupation (Data volume expansion function, per 1 slave)
Cyclic Transmission Data size	24Byte/1Station
Transmission data size	960Byte (Master->Slave 150Byte/Scan, Slave->Master 34Byte/Scan)
Total number of slave stations	Max 64Station Depends on occupied the number by 1 slave.
Communication speed and cable extension distance	10Mbps : 100m (Use of optical repeater : 4.3 km) 5Mbps: 160m (Use of optical repeater : 4.48 km) 2.5Mbps : 400m (Use of optical repeater : 5.2 km) 625Kbps : 900m (Use of optical repeater : 6.7 km) 156Kbps : 1200m (Use of optical repeater : 7.6 km) * Ver.1.10 compatible When using CC-Link dedicated cable
Communication Method	Broad Casting Pooling

3.2 Ezi-STEPII CC-Link Function

3.2.1 CC-Link Network

Ezi-STEPII CC-Link is connected to a remote device from CC-Link network, which is a high-speed fieldbus, and can set up to 4 stations for motion control.

	1 Station occupation	2 Station occupation	3 Station occupation (1*	4 Station occupation (1*
Number of modules connectable to the master equipment according to the occupied station	42 Module	32 Module	21 Module	16 Module
The allocation amount of the remote device according to the station occupancy (Data Volume)	RX/RY:32 point RWw/RWr:4 word	RX/RY:64 point RWw/RWr:8 word	RX/RY:96 point RWw/RWr:12 word	RX/RY:128 point RWw/RWr:16 word

*1) 3 and 4 station occupied modes are not supported by Ezi-STEPII CC-Link.

(It will be supported in the future.)

3.2.2 I/O Control

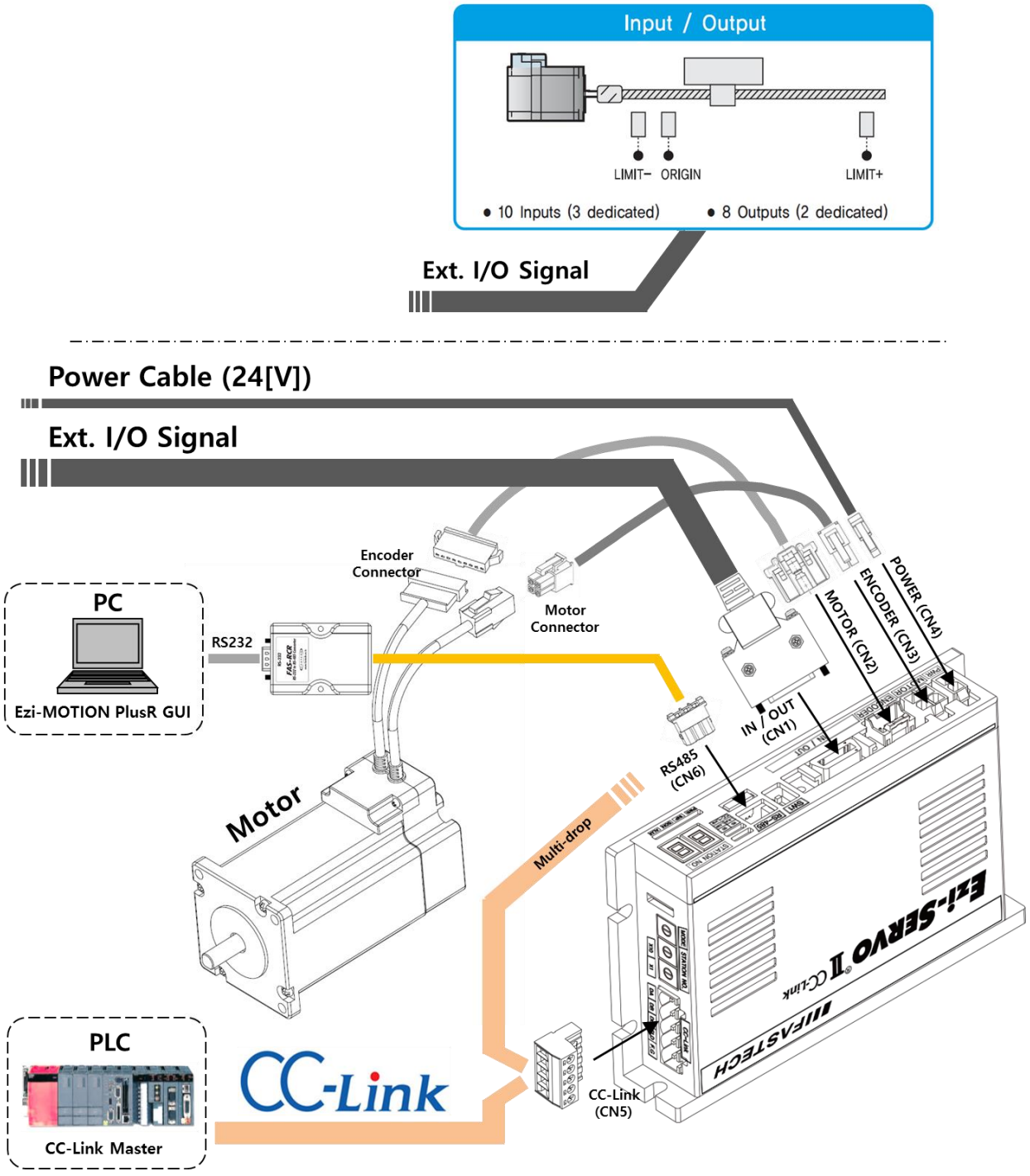
Ezi-STEPII CC-Link has seven inputs and six outputs, and each pin can be assigned a function to operate the system. In addition, by incorporating a position controller in the drive and connecting a H/W Limit sensor, which is a sensor signal that can define a limit, mechanical collision can be suppressed during motion control.

- Function Introduction : **"4.5.3 Use of External I/O"**
- Parameter and Function : **"5.5 External I/O Setting"**

3.2.3 Ezi-MOTION Plus-R Network

It is possible to connect with RS485 communication using FASTECH's proprietary protocol, and support Ezi-MOTION Plus-R DLL for motion library, parameter access, test operation and status monitoring.

3.3 System Configuration



3.4 CC-Link Remote I/O Device Map

3.4.1 I/O Device Map of 1 station occupation

RY	Output Device Name
RY00	MOTOR Enable
RY01	/Emergency Stop
RY02	ALARM RESET
RY03	Homing Start
RY04	JOG +
RY05	JOG -
RY06	Step + Move
RY07	Step - Move
RY08	STOP
RY09	HOLD
RY0A	Go Zero Position
RY0B	PT Start
RY0C	Single PT Select
RY0D	-
RY0E	Command Set
RY0F	Motion / Setting
RY10 ~ RY13	Step Move Position (1~10) BCD Data (Parameter : Multiple of Pn#B030)
RY14 ~ RY17	Monitor Code1 (Motion)
RY18 ~ RY1B	Command Code
RY1C	Processing Complete Flag
RY1D	Remote Clear
RY1E	RS485 Approval of use
RY1F	

RX	Input Device Name
RX00	MOTOR Enabled
RX01	Emergency Stopped
RX02	ALARM Status
RX03	Homing OK
RX04	MOTION READY
RX05	Jog Response
RX06	Step Move Response
RX07	RUN/STOP
RX08	MOTIONING
RX09	Hold status
RX0A	Go Zero Position Resp.
RX0B	PT Running
RX0C	Single PT Select Resp.
RX0D	Command Set Resp.
RX0E	Warning
RX0F	Motion / Setting Resp.
RX10 ~ RX13	Step Move Position Resp. (1~10) BCD Data Multiplier of X 10(Parameter Value)
RX14 ~ RX17	Monitor Code1 (Motion Mode) Data Code (Setting Mode) Response
RX18 ~ RX1B	Command Code Resp.
RX1C	Initial Data Processing Request
RX1D	Remote station READY
RX1E	RS485 Port Approved
RX1F	RS-485 Port Connected (1 sec)

RWw	
RWw0 RWw1	Operation Speed(Position Move, JOG Move) Configuration Data (Setting)
RWw2	PT No. / Parameter Code
RWw3	Accel & Decel Time (JOG Run, Step Move, Go Zero Position)

RWr	
RWr0 RWr1	Monitor Response Data(Motion) Command Response Data(Setting)
RWr2	PT No. / Parameter Code Resp.
RWr3	Warning Code

1) Network Connection Setting Bit

■ Initial Data Processing Request [RX1C]

State requiring initial data processing in Ezi-STEPII CC-Link.

■ Initial Data Processing Complete Flag [RY1C]

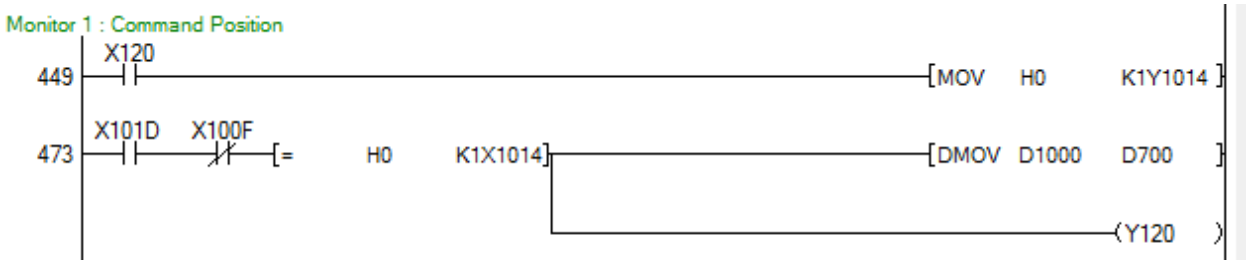
Notifying Ezi-STEPII CC-Link that the initial data has been processed.

■ Remote station READY [RX1D]

Ezi-STEPII CC-Link has completed the initialization work and can be executed. All commands must be processed with the "Remote READY" bit enabled.

Ex) Command Position Monitoring

- Remote Input Address (RX) : X1000
- Remote Output Address (RY) : Y1000
- Remote Resister Address (RWr) : D1000
- Remote READY bit : X101D



The value of input device is invalid when "Remote READY" is Off.

■ Remote Clear [RY1D]

This command is to disconnect Ezi-STEPII CC-Link. Remote READY bit is Off when "Remote Clear" is On.

■ RS-485 Port Connect [RY0E]

Allow control command via RS485 communication (Only can be executed in Servo Off)

■ RS-485 Port Approved [RX0E]

Response bit for control command via RS485 communication

■ RS-485 Port Connected [RX1F]

When command is received via RS485 normally, it stays 'ON' for 1 second.

2) Drive control command

■ MOTOR Enable [RY00]

As an active control bit of the motor, this bit must be kept on to run the motor. In addition, it must be kept ON in the system that activates the motor by external I / O.

■ Emergency Stop [RY01]

It is operated when it is Off by emergency stop command execution command. When executing motion command, it should be kept ON all the time.

■ ALARM RESET [RY02]

After clearing the cause of alarm, this bit can be On to clear the alarm that occurred in the drive.

■ STOP [RY08]

This command stops the current running motion profile. Also, stop can be performed while PT operation.

■ HOLD [RY09]

Hold motion command is used to pause the current motion profile. Motion commands that can be paused are jog commands and position movement commands.

3) Motion Control Command Bit

When the motion control command bit below is On, power should be supplied to the motor to make the motor ready (Servo On).

- Homing Start [RY03] : Execute homing command
- JOG + [RY04] : + Jog operation command
- JOG - [RY05] : - Jog operation command
- Step + Move [RY06] : + Step movement command
- Step - Move [RY07] : - Step move command
- Go Zero Position [RY0A] : Zero move
- PT Start [RY0B] : PT Operation

4) Special control command bit

- Single PT Select [RY0B] : Select Single PT Operation
- Command Set [RY0E] : Execution of Additional and Special Instructions
  - Used when applying speed override during jog operation
  - Used to access parameters

5) Special Control Command Support Bits

- Step Move Position [RY0B] : Position value of step movement command to be a multiple of parameter Pn # B03 Step Move Position Magnify
- Motion/Setting [RY0F] : If On, it is used in normal motion. If Off, command of command code is used.
- Command Code [RY18~RY1B] : Command type selection, the code number of the instruction executed with the Command Set [RY0E] bit On.

No.	Function	Description
0x0	-	-
0x1	Parameter Read	Requesting Parameter
0x2	Parameter Write	Changing Parameter
0x3	Parameter Save	Saving Parameter
0x4	-	-
0x5	-	-
0x6	-	-
0x7	Set User Output	User Out Pin Output
0x8	Clear Peak Load	Peak Load Data Initialization Command
0x9	-	-
0xA	Teaching A-POS	Execution of Teaching Command (Encoder Position)
0xB	Teaching C-POS	Execution of teaching command (Following Position)
0xC	-	-
0xD	-	-
0xE	Set Position	Change current position to a specific value
0xF	-	-

6) Command response bit

- Jog Response [RX05] : Response to jog command
- Step Move Response [RX06] : Response to step move command
- Go Zero Position Resp. [RX0A] : Response to zero position movement
- Single PT Select Resp. [RX0C] : Response to selection of single PT operation command
- Command Set Resp. [RX0D] : Response to running additional commands
- Motion / Setting Resp. [RX0F] : Response to mode of current I / O Map
- Step Move Position Resp. [RX10~RX13] : Position response data of step movement command
- Monitor Code(Motion Mode) [RX14~RX17] : Response of monitor code
- Command Code Resp [RX18~RX1B] : Response of Command Code

7) Monitoring Data Select Bit

- Monitor Code [RY14~RY17] : Requesting Data Information from Drives in Motion Mode(When Motion/Setting [RY0F] if Off)

No.	Function	Description
0x0	Real Command Position	Pulse information of position tracking Value
0x1	Real Actual Position	Pulse information of encoder position value
0x2	Real Position Error	Pulse information of error between position tracking value and encoder position value
0x3	Real Current Velocity	Pulse per sec information of command speed information during operation
0x4	Command Position	Position tracking value
0x5	Actual Position	Encoder position value
0x6	Position Error	Error between position tracking value and encoder position value
0x7	Current Velocity	Tracking speed information during operation
0x8	Unit	Current unit of operation
0x9	-	
0xA	-	
0xB	Get I/O Pin Status	Input / Output status
0xC	Get User I/O Status	User Input / Output status
0xD	-	
0xE	Axis Status 1	Status information of drive
0xF	-	

8) Drive status information bit

- MOTOR Enabled [RX00] : Motor excitation status
- Emergency Stopped [RX01] : Emergency stop status
- ALARM Status [RX02] : Alarm stop status
- Homing OK [RX03] : Home Return Completed
- MOTION READY [RX04] : Motion command available
- RUN/STOP [RX07] : Motor operating status
- MOTIONING [RX08] : Motioning status
- Hold status [RX09] : Paused status
- PT Running [RX0B] : PT operating status
- Warning [RX0E] : Error Status

3.4.2 I/O Device Map of 2 stations occupation

RY	Output Device Name
RY20	
RY21	
RY22	
RY23	
RY24	
RY25	
RY26	
RY27	
RY28	
RY29	
RY2A	User Output 1
RY2B	User Output 2
RY2C	User Output 3
RY2D	User Output 4
RY2E	User Output 5
RY2F	User Output 6
RY30	ABS Position Move
RY31	INC Position Move
RY32	Fixed Time Mode Select
RY33	
RY34	Position Override
RY35	
RY36	Position Move Speed Override
RY37	
RY38 ~ RY3B	Monitor Code(2)
RY3C ~ RY3F	Monitor Code (3)

RX	Input Device Name
RX20	H/W Limit +
RX21	H/W Limit -
RX22	Org Sensor
RX23	Input Pin 1
RX24	Input Pin 2
RX25	Input Pin 3
RX26	Input Pin 4
RX27	Input Pin 5
RX28	Input Pin 6
RX29	Input Pin 7
RX2A	Output Pin 1
RX2B	Output Pin 2
RX2C	Output Pin 3
RX2D	Output Pin 4
RX2E	Output Pin 5
RX2F	Output Pin 6
RX30	ABS Position Move Resp.
RX31	INC Position Move Resp.
RX32	Fixed Time mode Resp.
RX33	F.T Mode Warning Speed
RX34	F.T Mode Err. ultra-low speed Region
RX35	Z Phase
RX36	S/W Limit +
RX37	S/W Limit -
RX38 ~ RX3B	Monitor Code (2) Response
RX3C ~ RX3F	Monitor Code (3) Response

RWw	
RWw4 RWw5	Position Value (ABS Move, INC Move Pos)
RWw6	Accel Time (ABS Move, INC Move Pos)
RWw7	Decel Time (ABS Move, INC Move Pos)

RWw	
RWr4 RWr5	Monitor Response Data(2)
RWr6 RWr7	Monitor Response Data (3)

1) Motion Control Command Bit

- ABS Position Move [RY30] : Execute Absolute Position Move Command
- INC Position Move [RY31] : Execute Incremental Position Move Command
- Position Override [RY34] : Perform position override command during position movement
- Position Move Speed Override [RY34] : Perform speed override command during position movement

2) Output Command of User Output Pin

- Output1~6 [RY2A~2F] : Output User Output 1~6

3) Checking the Status of Ext. I/O Pins

- H/W Limit + [RX20] : The input status of H / W Limit + is displayed.
- H/W Limit - [RX21] : The input status of H / W Limit - is displayed.
- Origin Sensor [RX22] : The input status of the Origin Sensor is displayed.
- Input 1~7 [RX23~29] : The input status of the Input pin is displayed.
- Output 1~6 [RX23~29] : The output status of the Output pin is displayed.

4) Command response bit

- ABS Position Move Resp. [RX30] : Response bit for absolute position movement command
- INC Position Move Resp. [RX31] : Response bit for incremental position movement command
- Monitor Code (2) [RX38~RX3B] : Response bit of monitor code (2)
- Monitor Code (3) [RX3C~RX3F] : Response bit of monitor code (3)

5) Drive Status Information Bit

- Motion Accel. [RX33] : Acceleration state during motion
- Motion Decel. [RX34] : Deceleration status during motion
- Z Phase [RX35] : Encoder Z-phase sensor detected
- S/W Limit + [RX36] : Current Command Position value exceeds S / W Upper limit
- S/W Limit – [RX37] : Current Command Position is less than S / W Lower Limit

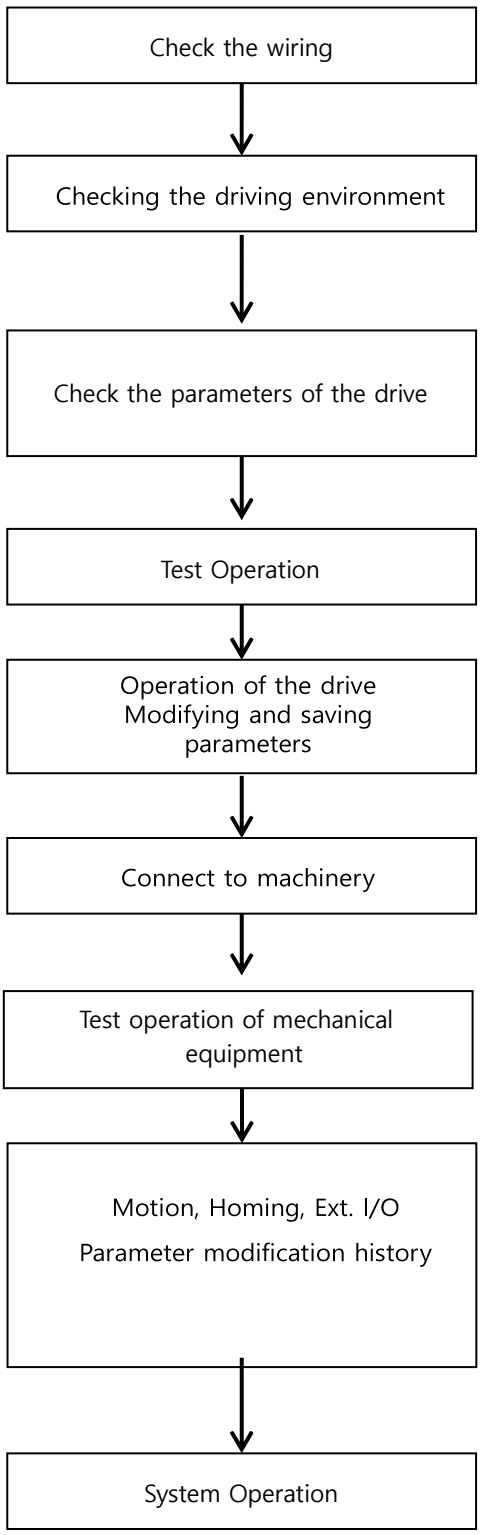
6) Monitoring data selection bit (Can also be checked in Setting Mode)

- Monitor Code (2) [RY38~RY3B] : Request data information from the drive
- Monitor Code (3) [RY3C~RY3F] : Request data information from the drive

4. Operation

4.1 Operation Sequence

In the first use, operation start according to this section.



Checking the Power supplied to the drive, motor, encoder, Ext. I / O cable connection with wiring diagram and make sure it is correct.

After power is applied, make sure that the drive and motor are free of dangers, drips and fire hazards.

Use the Ezi-MOTION Plus-R GUI to apply the operating parameters user want to use.

If there is a parameter file that user already has, reload it and set it on the drive.

Before connecting to the machine, run the motor drive test to make sure that the motor rotates correctly.

Save the parameters changed after the test operation to the internal memory of the drive so that there is no data loss even if the power is turned on / off.

Connect the drive and the motor to the machine so that they match their axes. (The type of motor applied to the drive must match the type of motor actually connected.)

Test the motor connected to the machine with the master controller.

Once the operation test of the machine has been completed, modify the operating parameters and the homing parameters to suit the operation and record them.

- It is recommended that the drive parameter be set automatically at the initialization setting during the boot process after power supply of the equipment system.

4.2 Check Wiring

Cable wiring must be kept free from interference with the operation of machinery.

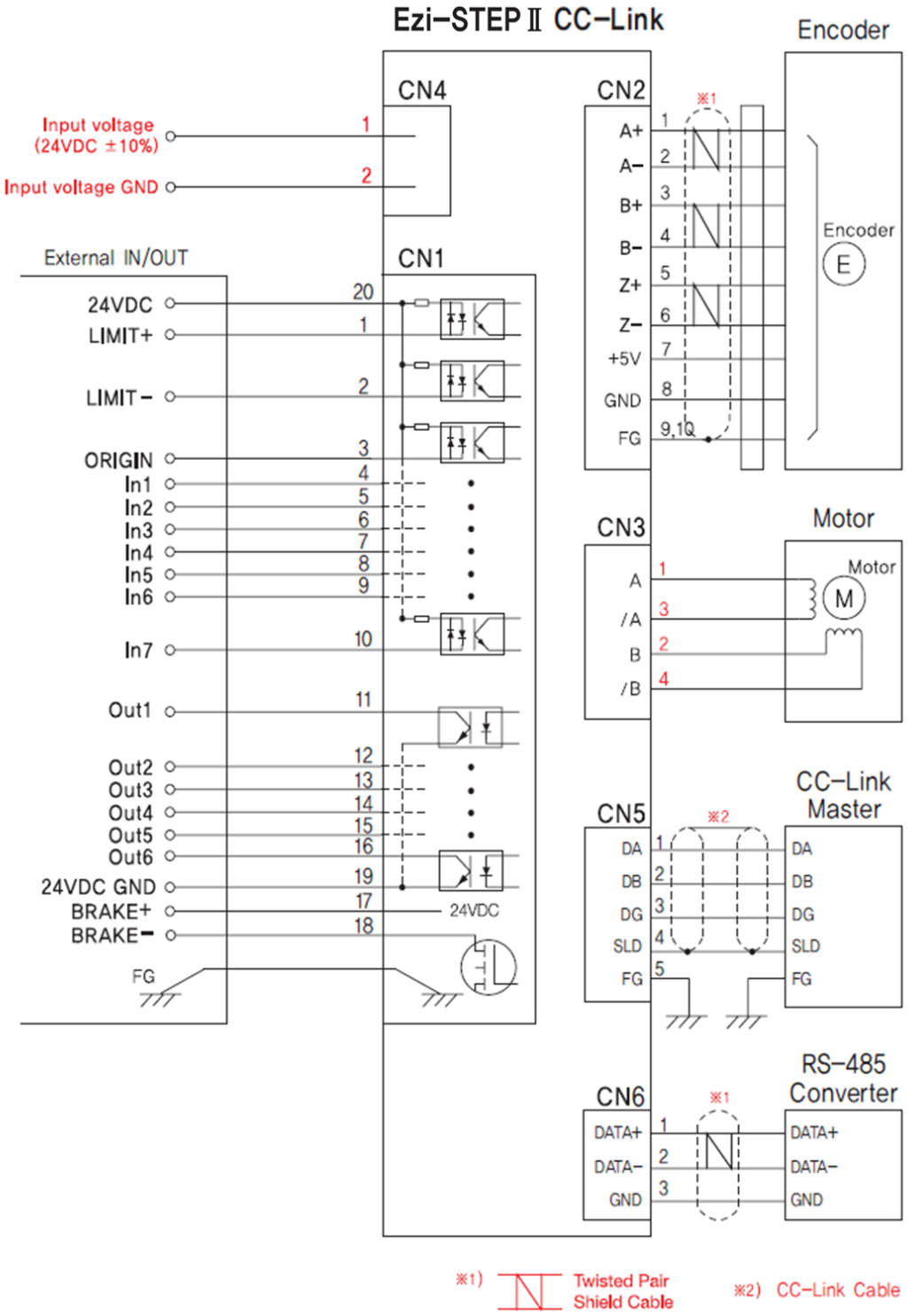


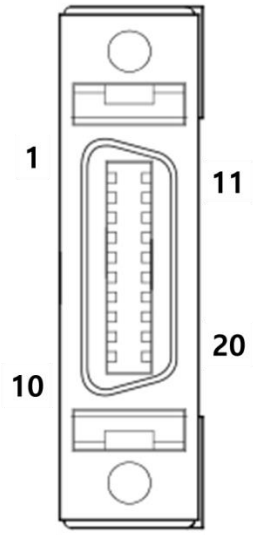
Fig. 4-1 Wiring Diagram of Ezi-STEPII CC-Link ST

4.2.1 Wiring of External I/O Cable [CN1]

Both the drive input and output signals are isolated by photocouplers and the signal status indicates the status of the internal photocoupler [ON: energized] and [OFF: unenergized], not the voltage level of the signal.

External I/O cable connector (CN1)

No.	Function	I/O
1	LIMIT+	Input
2	LIMIT-	Input
3	ORIGIN	Input
4	Input 1	Input
5	Input 2	Input
6	Input 3	Input
7	Input 4	Input
8	Input 5	Input
9	Input 6	Input
10	Input 7	Input
11	Output 1	Output
12	Output 2	Output
13	Output 3	Output
14	Output 4	Output
15	Output 5	Output
16	Output 6	Output
17	BRAKE +	Output
18	BRAKE -	Output
19	24GND	Input
20	24VDC	Input



Input / Output
Signal Connector

Drive Connector	
Connector	3M 10226-52A2PL

Cable Connector	
Connector	3M 10120-3000PE
Shell	3M 10320-52F0-008

■ I/O connection cable

Model Name	Length	Remark
CSVN-S-□□□F	□□□	Normal Cable
CSVN-S-□□□M	□□□	Robot Cable

Cable length is 1m, maximum length is 20m.

1) Signal input of H / W limit point and origin

The LIMIT+ and LIMIT- sensors are used as a signal to the limit points that limit the movement range of each axis in the clockwise and counterclockwise directions, which is used to prevent mechanical collision. The ORIGIN sensor is used to specify the mechanical origin. This sensor is connected to LIMIT+, LIMIT-, ORIGIN pin of IN / OUT connector.

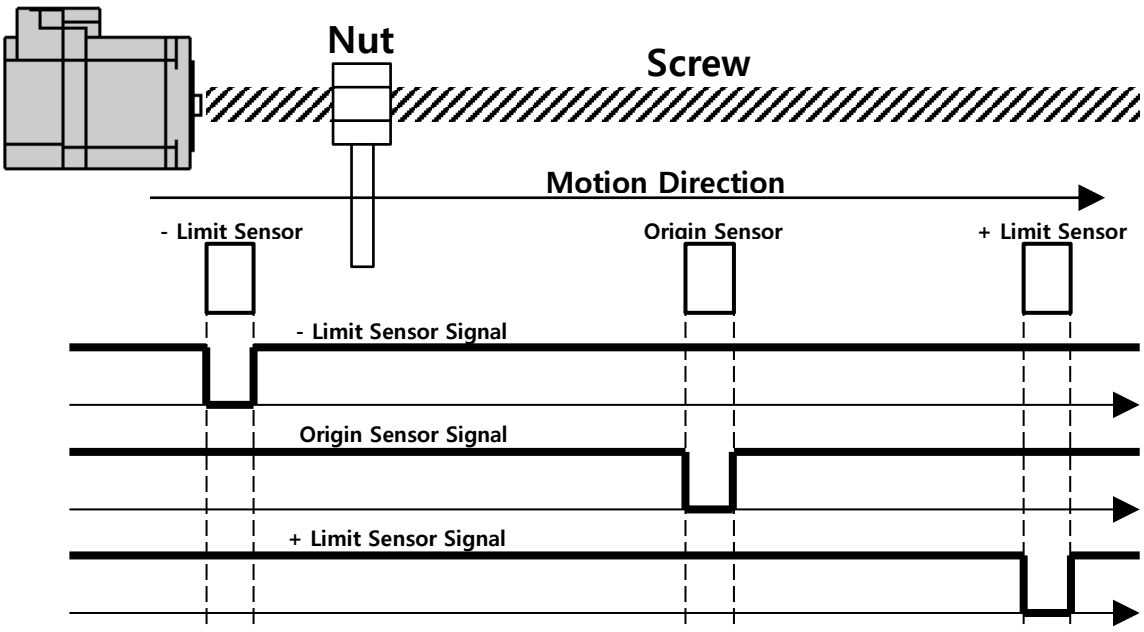


Fig. 4-2 Operation of limit sensor and home sensor

2) Brake Signal output signal

Brake function is used to prevent rotation of motor in Servo OFF state by using BRAKE+ / BRAKE- pin of CN1 I / O connector. 'BRAKE+' is for the + 24V supplied to the outside for driving the brake circuit, and 'BRAKE-' is the output signal for the actual brake control. The control signal is automatically output according to the servo ON / OFF status and alarm occurrence. Use this output function only when the current consumption of the brake is less than 200 [mA] / DC24V.

When the Servo On command is started, the brake will be released so that the motor shaft can operate after the default value of parameter "Pn # B00Bh Brake Delay Time" 200 [msec].

Warning	If 24V or more power is supplied to pins 19 and 20 of the CN1 connector of the drive, the drive may be damaged.

3) Input signal

This product has 7 input points. Prepare the input circuit power supply DC 24V ± 10% (consumption current about 5[mA] / circuit) separately.

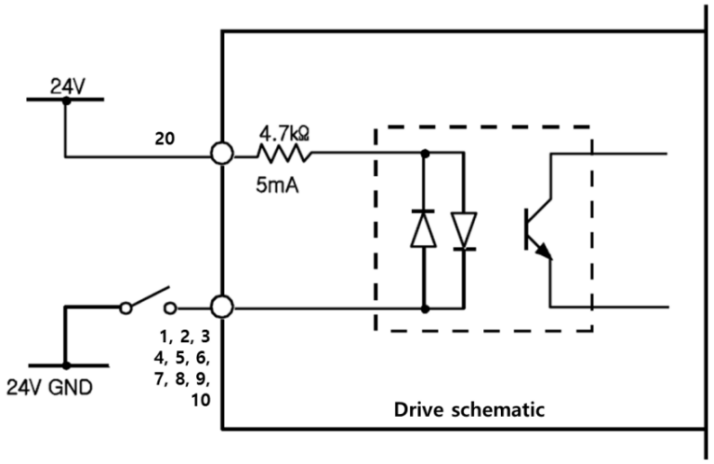


Fig. 4-3 Circuit of Ext. Input

- **Connection of NPN type input signal**

Connect the '+ 24V external' pin of the drive to + 24V of the host controller as shown below.

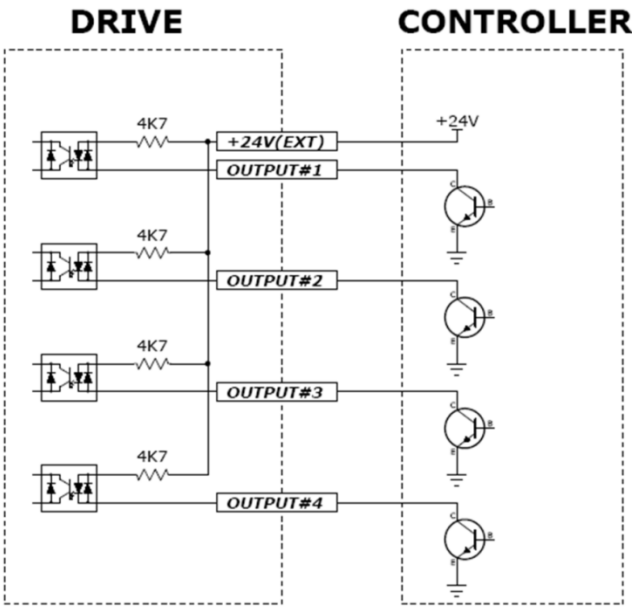


Fig. 4-4 Connection of NPN type input signal

- **Connection of PNP type input signal**

Connect the '+ 24V external' pin of the drive to the GND of the host controller as shown below.

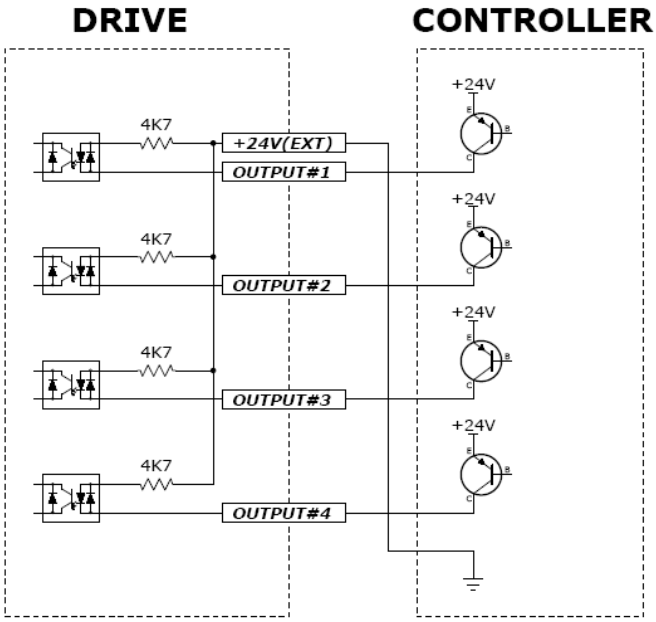


Fig 4-5 Connection of PNP type input signal

4) Output Signal

Prepare the power supply for the output circuit separately. Although it can be used in common with the input circuit power supply, the power supply capacity in this case should be added to the input power capacity and the output power capacity. Applied voltage and power supply capacity of control output terminal are as follows.

: Applied voltage ≤30V, Energizing current ≤15mA

This product provides 6 points of output.

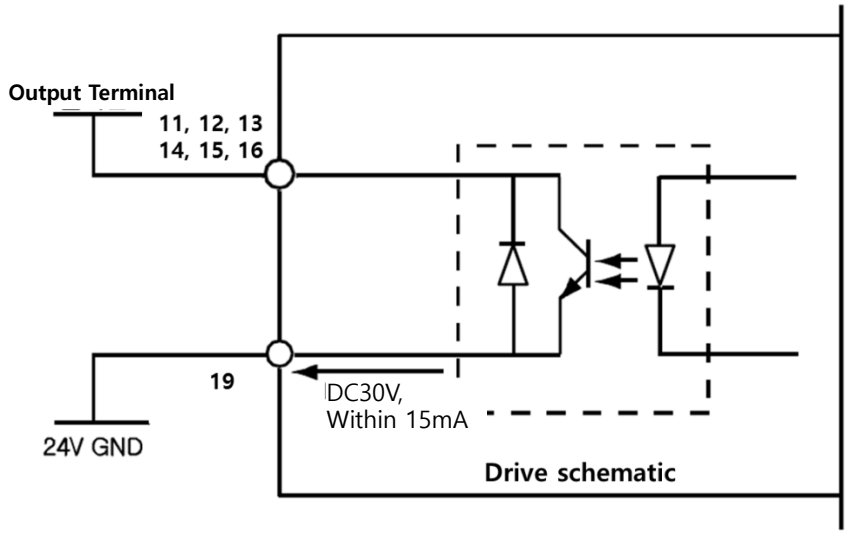


Fig. 4-6 Circuit of Ext. Output

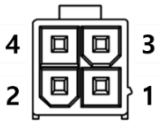
Attention	In order to use I / O signal, DC 24V ± 10% power must be supplied. If less voltage is applied, the input signal may not be detected. Also, when a large voltage is supplied, the photocoupler circuit inside the drive may be damaged.

4.2.2 Motor cable and Encoder cable wiring[CN2] [CN3]

Motor and encoder cables are most likely to interfere with machinery. Be careful not to interfere with the movement path of the machine on other axes when using in multi-axis connected equipment system.

Drive side motor connection terminal [CN2] (Ezi-STEPII CC-Link ST)

No.	Function
1	A
2	B
3	/A
4	/B



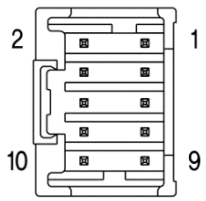
Motor Connector

(Connector type : Molex 5569-04A2)

Cable Connector	
Terminal	MOLEX 5556T
Housing	MOLEX 5557-04R

Encoder connection terminal (CN3)

No.	Function
1	A +
2	A -
3	B +
4	B -
5	Z +
6	Z -
7	5VDC
8	5V GND
9	Frame GND
10	Frame GND



Encoder Connector

(Connector type: Molex 55959-1030)

Cable Connector	
Terminal	MOLEX 56134-9000
Housing	MOLEX 51353-1000

■ Encoder extension cable

Model Name	Length	Remark
CSVO-E-□□□F	□□□	Normal Cable
CSVO-E-□□□M	□□□	Robot Cable

The length of the cable is in 1m increments, and the maximum length is 20m.

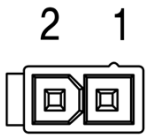
Reference	The encoder cable is a cable that can be used with FASTECH EzM-□□x motor.
Attention	The pin map of the motor connector and the motor connection terminal on the drive side are not direct connections. Please be careful when making cables.

4.2.3 Power Wiring [CN4]

Check the supply voltage of the drive and use the SMPS power suitable for the voltage.

Power connection terminal (Ezi-STEPII CC-Link ST)

No.	Function
1	24VDC ± 10%
2	GND



Power Supply Connector

(Connector type : Molex 5569-02A2)

Cable Connector	
Terminal	MOLEX 5556T
Housing	MOLEX 5557-02R

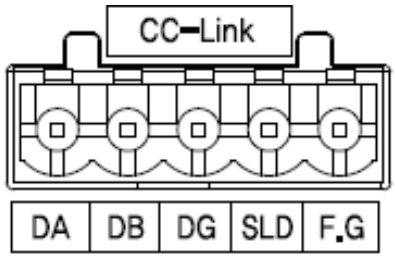
The length of the cable is in 1m increments, and the maximum length is 20m.

4.2.4 CC-Link Cable wiring [CN5]

The CC-Link connector is used as a detachable connector. The function of each pin must be connected equally to enable normal network connection.

CC-Link terminal

No.	Function
1	DA
2	DB
3	DG
4	SLD
5	FRAME GND



CC-Link Connector

Cable Connector	
Pin Strip / Terminal Block	AK950-5P

CC-Link network cable

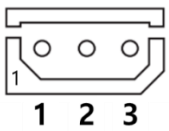
* CC-Link network cable is not handled by us.

4.2.5 RS-485 Cable wiring [CN6]

Ezi-STEPII CC-Link can be monitored by RS-485 communication.

RS-485 단자

No.	Function
1	DATA+
2	DATA-
3	GND



RS-485 Connector

Cable Connector	
Housing	MOLEX 5264-03
Terminal	MOLEX 5263PBT

■ RS-485 cable

Model Name	Length	Remark
CGNR-RT-□□□F	□□□	Normal Cable

Cable length is 1m, maximum length is 20m.

■ FAS-RCR (RS-232C to RS-485 Converter

Item	Standard
Communication Speed	Max. 115.2 kbps
Communication Distance	RS-232C : Max. 15m RS-485 : Max. 1.2km
Connector	RS-232C : DB9 Female RS-485 : RJ-45
Size	50 x 75 x 23mm
Weight	38g
Power	RS-232C own power (DC5~24V External power available)

■ RS-232C Cable

Model Name	Length	Remark
CGNR-C-002F	2	Normal Cable
CGNR-C-003F	3	
CGNR-C-005F	5	

4.3 Driving a motor

4.3.1 Power On/OFF Method

1) Power On

If the drive is powered separately, proceed as follows:

① Release the Step On command from the host controller to make Step Off.

- If a large number of drives are powered on and the Step On command is executed, the power supply may be damaged.
- If the motion command is set to be executed, the motor can be started simultaneously with Step On.

② When using external I / O, Ext. Turn off the power to the I / O.

- If Step On or Motion command is inputted as an external input signal, the motor can be started simultaneously with power supply.

2) Power Off

Please pay attention to the following points for the stability of the equipment system and the circuit protection of the drive.

① Disconnect the power by instructing the drive to cancel the Step On state.

- The operation of the brake will operate below a certain voltage, so it will not operate immediately when the power is turned off. Therefore, Servo Off command must be executed to turn off the power and then the power must be cut off.

② If the motor is running, turn off the power after stopping the operation.

- If the power is turned off during operation, mechanical shock due to inertia may occur.

③ After the power supply of the drive is turned off, do not forcibly rotate the motor.

- Forced rotation of the motor may generate regenerative voltage, which may damage the drive.

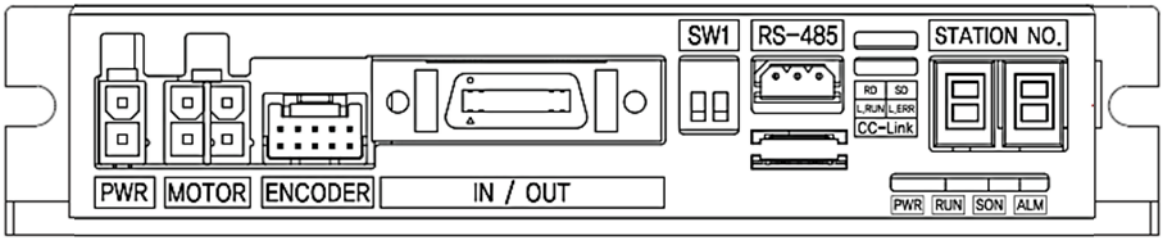
4.3.2 Operation Stop

The drive stops the operation of the motor under the following conditions.

1) STOP Command (Slow Stop : Stop with deceleration value included in motion profile)
2) E-STOP command (Emergency stop : Forced Stop)
3) Servo On release command (Servo Off : Power off the motor and keep it in the free run state)
4) Alarm occurrence
5) Input the H/W Limit signal
6) The limit of S/W limit is reached.
7) Disconnect the network (can be changed by parameter setting)

4.3.3 CC-Link Station Occupying Setting

Ezi-STEPII CC-Link can be used by setting station 1 and station 2 to occupied mode with SW1 switch.



Station occupation Switch Setting [SW1]		Operating Characteristic
2	1	
0	0	1 Station Occupied Mode
0	1	2 Station Occupied Mode

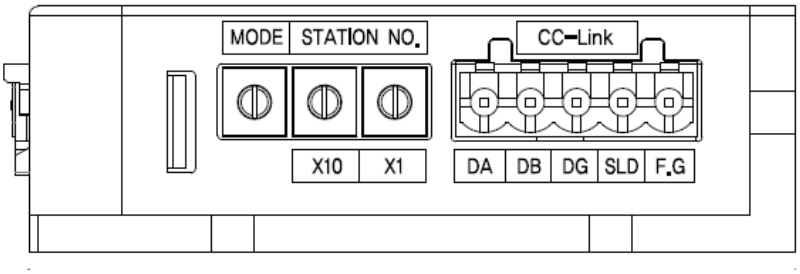
Relationship between the number of occupied stations and the number of connected modules.

Station Occupied No.	1 Station Occupied	2 Station Occupied	4 Station Occupied	4 Station Occupied
Number of modules connected to each remote device station by master	**42**	**32**	**21**	**16**

* When the number of connected remote device stations are equals the number occupied.

4.3.4 Setting the Drive Identification Number

This product changes the CC-Link network station number setting to "STATION NO." Rotary switch. The User must set the station number and reboot the drive.



Attention	In the CC-Link network, the station number cannot be 0. : Available station number 1 ~ 63 Ezi-STEPII CC-Link is a remote device that can be connected to up to 42 units when it is set to station 1 occupied mode.

4.3.5 Network Mode Setting

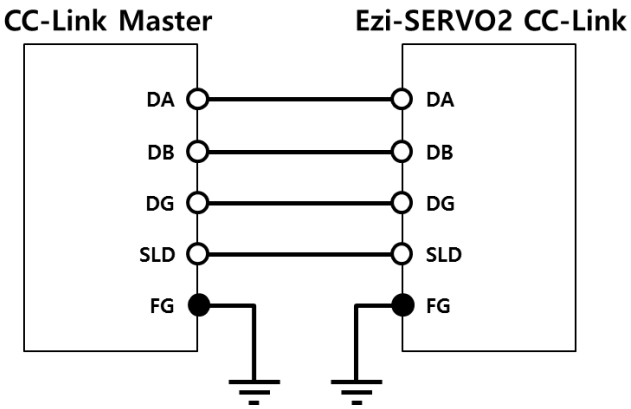
The communication speed of Ezi-STEPII CC-Link is changed with "MODE" rotary switch. The communication speed setting of the CC-Link network must be the same as the communication speed of the CC-Link master. After changing the CC-Link communication speed, be sure to re-boot the drive.

MODE	CC-Link Baud-Rate
0	156 kbps
1	625 kbps
2	2.5 Mbps
3	5 Mbps
4	10 Mbps
5...9	Not used

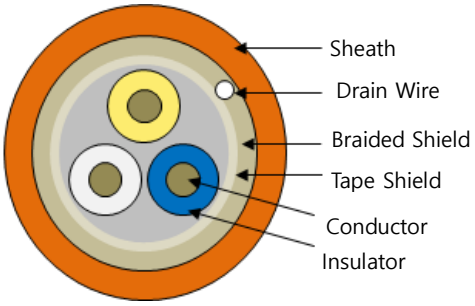
Attention	Depending on the set communication speed, the total extension distance of the system will be different. Refer to the CC-Link master user manual for specifications.

4.3.6 Network Cable Connection

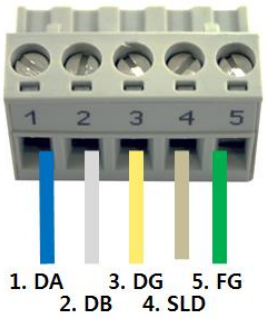
The pin map of the CC-Link network cable is the same as that of all CC-Link remote devices.



CC-Link network cable	Pin map of CC-Link connector



Core wire type	Data name
Blue	DA
White	DB
Yellow	DG
Drain Wire or Braided Shield	SLD



* The FG (5.) Pin is an enclosure ground pin and may not be included in the CC-Link cable.

Attention

Ezi-STEPII CC-Link follows to the CC-Link network protocol. Refer to "Open Field Network CC-Link Catalog" for details on setting the value of termination resistance according to the length of the network cable and how to wire the network cable.

4.3.7 Connection with CC-Link master PLC

When user want to set the CC-Link network parameters by opening the CC-Link card setting window in GX-Works or GX-Developer, user can set CC-Link network parameters in the module field of CC-Link card (QJ61BT11N) to which Ezi-STEPII CC- Mode to Remote Net (Ver.2 Mode) *. (* Can be mixed with CC-Link Ver.1 in this mode.)

Ezi-STEPII CC-Link must be assigned as a remote device when setting start I / O and start register, and station information. Also, set the Number of Occupied Stations as same as the information of the station occupancy switch SW1.

⚠ **Attention**	Ezi-STEPII CC-Link is compatible with CC-Link Ver.2.0. When using a remote I / O device to be used as CC-Link Ver.1, set CC-Link Ver.2 in the CC-Link network parameter setting and set the station type of the corresponding remote I / O in station information (Station Type) to "Ver.1 Remote I / O Station".

4.3.8 Access to Windows GUI program or RS-485

Ezi-STEPII CC-Link supports motion library (Ezi-MOTION PlusR DLL) manufactured by Ezi-Motion PlusR protocol through separate RS485 port. Therefore, it is possible to connect with Ezi-MOTION PlusR GUI program which is the GUI program of Ezi-MOTION PlusR product family. (This program can be downloaded from the website of www.fastech.co.kr)

In the provided Windows GUI program, Ezi-STEPII CC-Link Parameter setting and position table information can be modified and basic motion test can be performed.

When controlling Ezi-STEPII CC-Link via separate RS485 port, Ezi-STEPII CC-Link must release CC-Link network or release CC-Link master control authority.

⚠ **Attention**	Ezi-STEPII CC-Link is compatible with Ezi-MOTION Plus-R GUI Ver.6.40.11.XX or higher.
⚠ **Attention**	The parameter code (2 bytes) for access to the remote device area of the CC-Link network via the host controller and the parameter code (1 byte) for the Ezi-MOTION Plus-R Protocol parameter access command are not mixed.
⚠ **Attention**	When connected to CC-Link master when RS-485 is connected, it is not possible to change the motion control and parameter, and only the current status flag information and parameter value can be checked.

4.3.9 Test Operation

Before connecting the motor to the mechanical device and before starting the system operation, operate the motor to check that the mechanical device operates normally.

1) Test operation with CC-Link master

① Setting CC-Link Network Parameter of Master

② Check the status LED of the drive and check that it is normal

③ Execute monitoring data of Start I / O Address

④ Change the master I / O device data to the I / O Device Mapping value for the corresponding command of Ezi-STEPII CC-Link and execute test operation.

2) Test operation with Ezi-MOTION PlusR GUI program

① Block communication with the CC-Link master or disconnect the cable

② Connection with RS-485 port of drive through PC and RS-485 converter

③ Run Ezi-MOTION PlusR GUI program to test

4.3.10 Parameter Access

Parameter of Ezi-STEPII CC-Link can be changed by command to access CC-Link remote device and window-based Ezi-MOTION Plus-R GUI program.

Parameter Classification	Parameter Start Address	Description	Write condition
Operating	0xA000	Drive information and network operation parameters	Servo Off
Drive control	0xB000	Parameter for drive control for 1 axis	Servo Off
Motion control	0xB100	Parameter of motion profile	Servo Off/On
Homing control	0xB200	Parameter of homing profile	Servo Off/On
Ext. I/O control	0xE000	Assigned information and level control of external I / O	Servo Off
Position Table	0x9000	Items in the position table	Servo Off/On

4.3.11 Position Table Setting

The items of the position table are accessed by the parameter number of the CC-Link I / O Map. Parameter number is WORD unit, upper byte is PT item, lower byte is PT number.

High	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Device Address	Position Table Item No.								Position Table No.							

Ex) When the target position value of PT No.14 is changed, the upper device value becomes 0x810E.

The items in the position table are as follows. Refer to the "Ezi-SERVO Plus-R Position Table Function" in the User's Manual.

Remote PT Item No.	Setting Item	Description	Unit	Lower Limit	Upper Limit
80h	Command (Type of command)	Specifies the type of motion to be executed.	-	0	10
81h	Position (Movement amount)	Position / movement amount is set by pulse.	pulse	-134,217,728	+134,217,727
82h	Low Speed (Low speed motion speed)	Set the number of pulses according to the type of motion.	pps	1	500,000
83h	High Speed (High speed motion speed)	Set the number of pulses according to the type of motion.	pps	1	2,500,000
84h	ACC time (Acceleration time)	Sets the acceleration time at the start of motion in msec.	msec	1	9,999
85h	DEC time (Deceleration time)	Sets the deceleration time at the end of motion in msec.	Msec	1	9,999

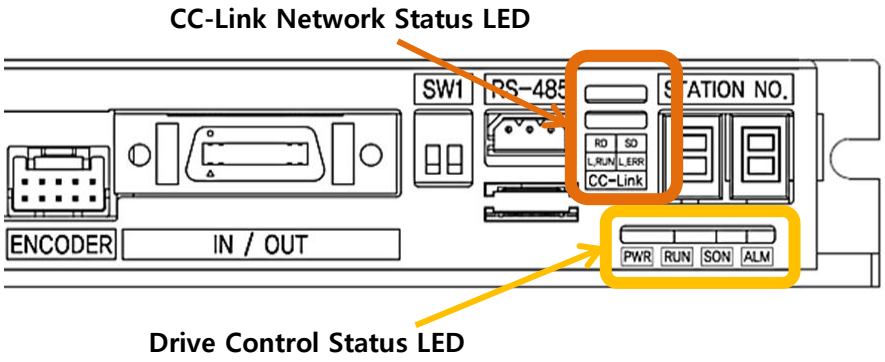
Remote PT Item No.	Setting Item	Description	Unit	Lower Limit	Upper Limit
86h	Wait time (Waiting Time)	When the PT number item to jump is set, the waiting time until the next position operation is started is set in units of msec. If JP Table No is set to 'blank' and Continuous Action is checked, this item will be ignored.	msec	0	60,000
87h	Continuous action (Continuous operation yes / no)	When set to 'check' (1), the current position is linked to the next position operation.	-	0	1
88h	JP Table No. (Jump position No.)	After the position operation is completed, the position operation of the jump PT is executed automatically.	-	0	255
8Ch	Loop Count (Loop count)	After execution of the number of times of setting the position (loop count), jump to a separate correspondence number (jump position number after loop) different from "jump position number".	-	0	100
8Dh	Loop Jump Table No.			0	255
	(Jump position number after loop)		-	10,000	10,255
8Fh	Loop Counter Clear (Loop clear)	Clears the loop counts of the position number for the set number.	-	0	255

Attention

The function of the position table is the same as that of Ezi-SERVO Plus-R. However, please note that it does not support the function of outputting to the external output among the position table functions.

4.4 Drive Status Display

The status display of the drive is composed of four CC-Link network status LEDs and four Ezi-STEPII CC-Link drive control status LEDs.



4.4.1 7-Segment for station number display

1) Station number display

When the drive is normally connected to the CC-Link network, the 7-segment displays the station number with the status lighting.

When the drive is powered up, the network identification number will flash if it is not connected to the CC-Link network. At this time, if the network connection is normalized, the blinking ID number will stay on.

2) Station number change

During system operation, CC-Link station number FND flashes by setting the rotary switch.

3) ERROR value display

When an error occurs in the controller of the drive (Fault status), the Error value is displayed in the 7-Segment instead of the CC-Link station number. The Error value is displayed in the form of 'E-000' every 3 characters in 7-Segment. Characters are switched every second.

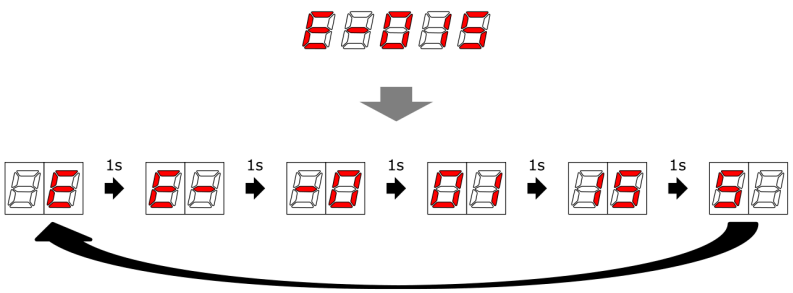


Fig. 4-7. Display Error value (Ex: E-015)

The first digit of the Error value indicates the status value of the CC-Link Error, the second digit and the third digit indicate the drive's alarm status.

■ CC-Link network status 7-Segment display information

ERROR Display	Description
E-0□□.	CC-Link network in normal state
E-1□□.	CC-Link station number switch setting is incorrect
E-2□□.	CC-Link Mode switch setting is incorrect
E-3□□.	CC-Link station number switch setting is changed
E-4□□.	CC-Link Mode switch setting is changed
E-5□□.	CRC error occurs in CC-Link communication
E-6□□.	Timeout occurs during communication with master
E-7□□.	Communication with master is disconnected
E-8□□.	CC-Link processor error 1
E-9□□.	CC-Link processor error 2
E-A□□.	Data link error
E-B□□.	Remote I/O error
E-C□□.	Remote resister error

■ Drive control status 7-Segment display Information

ERROR Display	Description
E-□00.	Drive in normal state
E-□01.	The current through power devices in inverter exceeds the limit value *1
E-□02.	Motor speed excess 3300[rpm]
E-□05.	Temperature of inside of the drive exceed 85°C
E-□06.	Back EMF of motor exceeds limit value *2
E-□07.	When there is a problem with the connection between the drive and the motor
E-□09.	When the supply power to the motor is below the lower limit value
E-□bF.	Data error in internal EEPROM

*1 Detection current: 4.5A, *2 Limit value: 70V

4.4.2 CC-Link status display LED

LED Display	Operation Status	Function	Action
L RUN (Green)	Off	Power OFF	Checking the power status
		No network connection	Checking the status of network cable and Master controller connection
	On	Normal operation	CC-Link network connection is normal status
L ERROR (Red)	Off	Normal operation	No error occurred
	On	Critical error	Communication process fails
	Flashing	Communication error	Error occurred in the CC-Link network Check the 7-Segment display information and process it
	Random flashing	CRC error, Network cable error	There is a contact error of the network connector or noise in the cable line. To check the terminating resister attachment status, network wiring, and grounding status with frame

4.4.3 Drive status display LED

Indication	Color	Function	On/Off Condition
PWR	Green	Power Input Indication	LED is turned On when Power On
RUN	Yellow	Running Indication	Lights up when the motor is running
SON	Orange	Motor Enable status Indication	Enable : Light On, Disable: Light Off
ALM	Red	Alarm Indication	Repeated blinking when protection function is activated (counting the number of LED flashes shows the function of the activated protection function)

4.5 Type of Operation Command

Type of motion command	Additional explanation
Homing	Execute the Homing command - Homing Sensor - Limit Sensor - Z-Phase Signal - Mechanical limit detection
JOG Operation	Depending on the input status, operation up to the limit point
JOG Speed Override	Change of motor rotation speed during JOG operation
Step Move	Move as much as user setting
Origin Move	Move to set Drive Origin in Drive
Position Table Operation	Motion profile stored in position table
Position Table Single Operation	Only one motion profile stored in the position table
Absolut Position Move	Moving the target position to the tracked position information
Incremental Position Move	Moves the target position to the addition or subtraction position at the current position
Absolut Position Override	Moving the target position during operation to new tracked position information
Incremental Position Override	Move by change the target position during operation to the added or subtracted position at the current position
Position Move Speed Override	Speed change during position movement

Ezi-STEPII CC-Link has a limited data memory map due to the network characteristic. Therefore, extended command can be executed by setting the station 1 occupied mode and the 2 station occupied mode.

User can execute a command by assigning a specific command to an external input signal.

4.5.1 1 Station occupied mode

- Homing movement : Mechanical origin is designated by homing method saved as parameter.
- JOG Operation : Moves to the limit by the entered speed value.
- JOG Speed Override : Move to the limit point by change the initial input speed value during JOG operation.
- Step Movement : Only when the command signal is held, it is additionally moved as much input position, and it is stopped when the command signal is interrupted during the movement.
- Zero Position Movement : Move to Zero position.
- Position Table Operation : Execute operation with motion profile stored in drive.

4.5.2 2 Station occupied mode

- Absolute Position Move : Move to entered position value.
- Absolute Position Override Move : Change target position value during absolute position movement.
- Incremental Position Move : Additional move by the entered position value.
- Incremental Position Override Move : Change additional movement value during incremental position movement.
- Position Move Speed Override : Change moving speed value during position movement.

4.5.3 User External I/O

Ezi-STEPII CC-Link can be used by assigning each function to 7 inputs. This input information can be assigned redundantly.

Mapping Info. Value [info]		Function	Motion [HEX]
[HEX]	[DEC]		
0x00	0	None	No operation
0x01	1	User Input 1	User Input 1
0x02	2	User Input 2	User Input 2
0x03	3	User Input 3	User Input 3
0x04	4	User Input 4	User Input 4
0x05	5	User Input 5	User Input 5
0x06	6	User Input 6	User Input 6
0x07	7	User Input 7	User Input 7
0x10	16	E-STOP	Emergency stop command
0x11	17	MOTOR Enable	Excites the motor by running electric current through the motor.
0x12	18	Alarm Reset	Release the alarm of drive
0x13	19	S-STOP	Decelerate to stop operation
0x14	20	Home Search	Star homing
0x15	21	Clear Position	Set current position to "0"
0x16	22	JOG +	Forward jog operation
0x17	23	JOG -	Reverse Jog operation
0x18	24	STEP +	Forward step movement
0x19	25	STEP -	Reverse step movement
0x1A	26	Go Zero Position	Return to Zero position
0x1B	27	Pause	Motion Pause
0x1C	28	Teaching	Teaching command
0x20	32	PT A0	Position Table No. - Set to 8-bit value from 0~255 Attention: Ezi-STEPII CC-Link input signals can be assigned up to 7, please pay attention to the assignment of PT number.
0x21	33	PT A1	
0x22	34	PT A2	
0x23	35	PT A3	
0x24	36	PT A4	
0x25	37	PT A5	
0x26	38	PT A6	
0x27	39	PT A7	
0x28	40	PT Start	Position Table Start
0x29	41	Single PT Select	Selecting single operation mode of Position Table

Ezi-STEPII CC-Link can be used by assigning each function to 6 inputs. This output information can be duplicated.

Mapping Info. Value [info]		Function	Motion
[HEX]	[HEX]		
0x00	0	None	
0x01	1	User Output 1	User Output 1
0x02	2	User Output 2	User Output 2
0x03	3	User Output 3	User Output 3
0x04	4	User Output 4	User Output 4
0x05	5	User Output 5	User Output 5
0x10	16	Motioning	In Motion
0x11	17	Step On	Motor is excited
0x12	18	RUN/STOP	Motor is running
0x13	19	Alarm	Alarm stop status
0x14	20	Motion Ready	Motion command enabled state
0x15	21	Accel / Decel	During motion operation, acceleration / deceleration state
0x16	22	Motion Direction	Operation direction of motor (OFF: + direction, ON: - direction)
0x18	24	END	Position Table Stop
0x19	25	HOMING	Homing
0x1A	26	Homing OK	Homing Completed
0x1B	27	Warning	Error occurred

4.5.4 User output setting

Ezi-STEPII CC-Link can set 6 output signals by user. This pin output mapping can be set as "4.20.2 **Parameter change**" for user output signal setting.

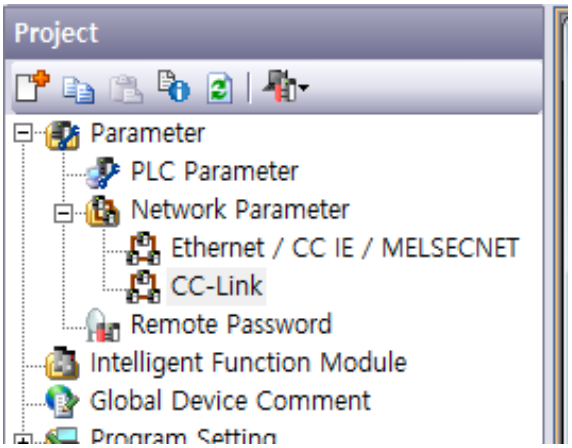
4.6 CC-Link Parameter Setting

This manual is written based on GX Works 2.

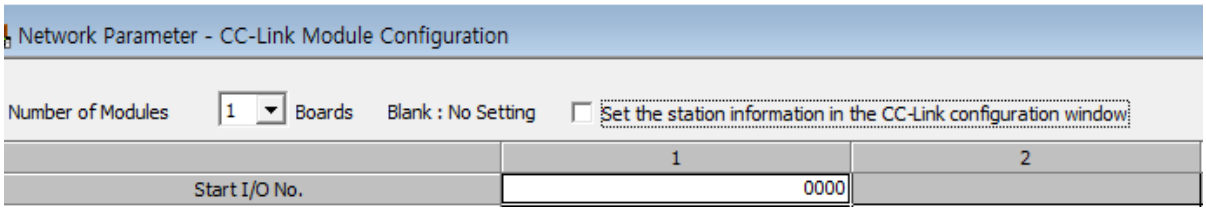
4.6.1 General setting

As a general setting method, use GX Works2 and other programs like GX Developer..

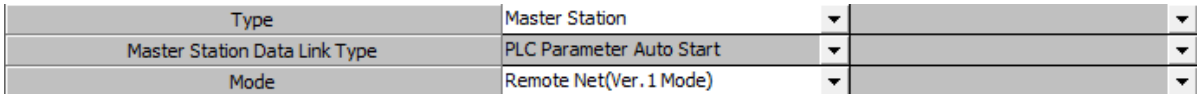
① Ezi-STEPII CC-Link can be connected with CC-Link Ver.1. To connect to the master controller, double-click [Parameter] - [Network Paramter] - [CC-Link] in the PLC program project.



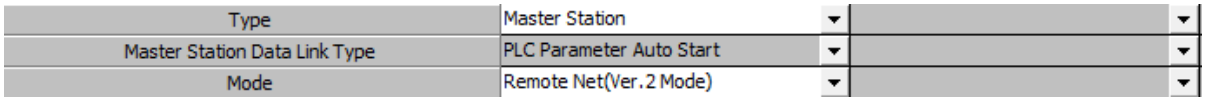
② In the CC-Link Module Configuration window, set the number of modules (CC-Link module) and the value of Start I / O according to your system environment.



③ If user system is using CC-Link Ver.1, set it to Remote Net (Ver.1 Mode).



However, if user system uses CC-Link Ver.2, set it to Remote Net (Ver.2 Mode).



④ Enter the number of devices to be connected to the CC-Link network. (1 in this manual.)

Total Module Connected	1	

⑤ Set the CC-Link remote device start address.

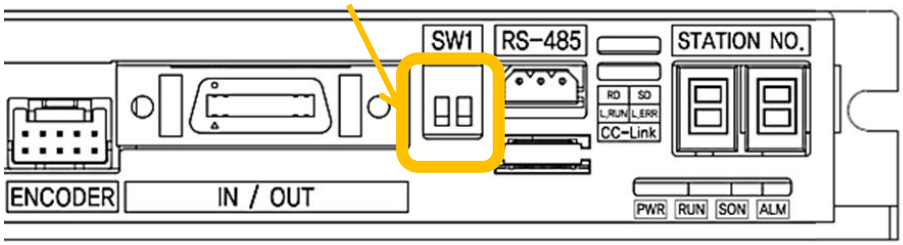
Remote input(RX)	X1000	
Remote output(RY)	Y1000	
Remote register(RWr)	D1000	
Remote register(RWw)	D2000	

The remote device set in this manual

- Remote Input Address (RX) : X1000
- Remote Output Address (RY) : Y1000
- Remote Resister Address (RWr) : D1000
- Remote Resister Address (RWw) : D2000

⑥ Set the switch value of SW1 on the front side of Ezi-STEPII CC-Link of the station number to be occupied according to the system condition.

Number of Occupied Station Setting Switch



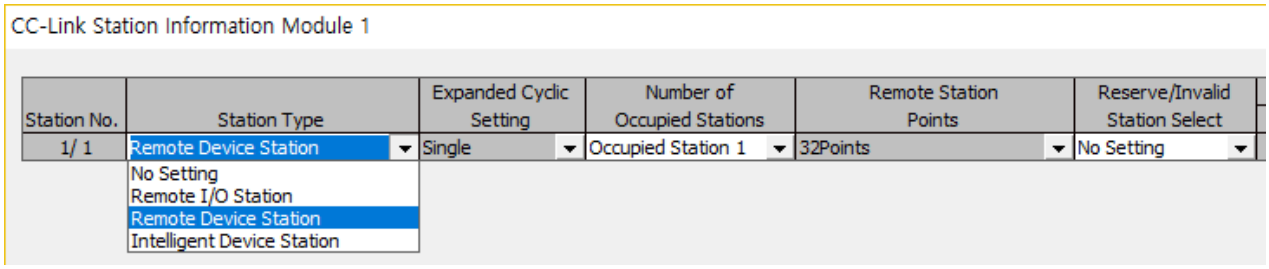
Switch Information

SW1.2	SW1.1	Occupied station No.
OFF	OFF	1
OFF	ON	2
ON	OFF	3 (No function)
ON	ON	4 (No function)

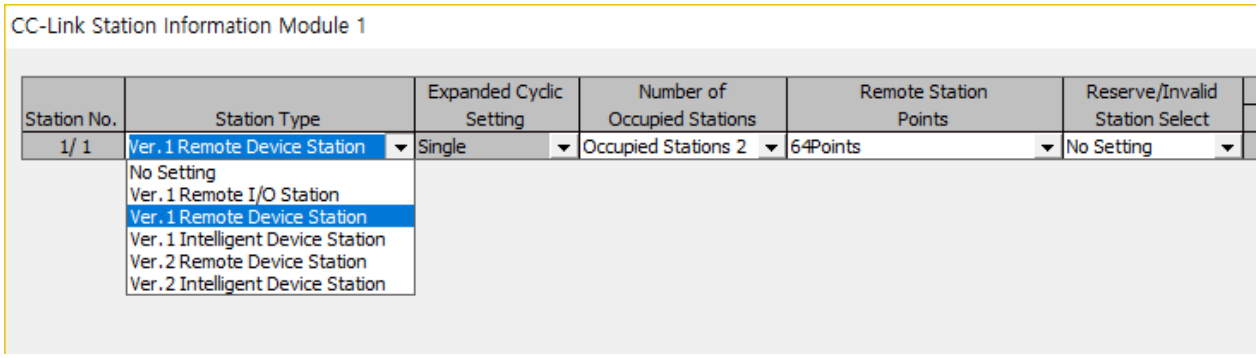
⑦ Set device information connected to CC-Link network.

Station Information Setting	Station Information	

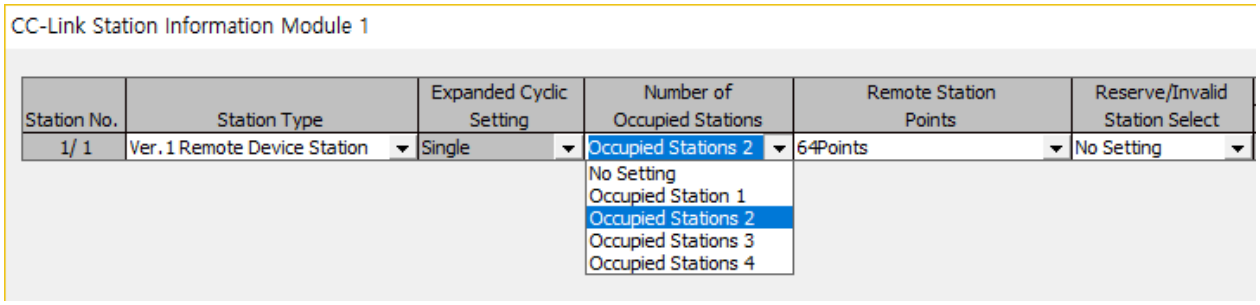
⑧ If the CC-Link network is Ver.1, Station Type is set to Remote Device Station.



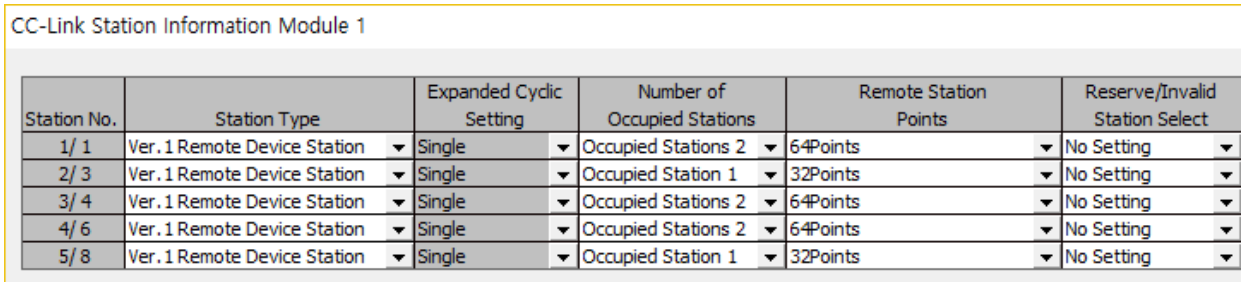
⑨ If the network of CC-Link is Ver.2, station type should be set as Ver.1 Remote Device Station.



⑩ The setting of the number of occupied stations must be set according to the user system and set the same as the switch setting information of SW1 on the front side of Ezi-STEPII CC-Link.



⑪ If several connected stations are connected and the occupied station is also different, the station numbers are arranged as follows. At this time, the CC-Link station number should be set to the value declared here.



⑫ This manual is written with set up as follows.

Network Parameter - CC-Link Module Configuration

Number of Modules 1 Boards Blank : No Setting Set the station information in the CC-Link configuration window

	1	2
Start I/O No.	0000	
Operation Setting	Operation Setting	
Type	Master Station	
Master Station Data Link Type	PLC Parameter Auto Start	
Mode	Remote Net(Ver.2 Mode)	
Total Module Connected	1	
Remote input(RX)	X1000	
Remote output(RY)	Y1000	
Remote register(RWr)	D1000	
Remote register(RWw)	D2000	
Ver.2 Remote input(RX)		
Ver.2 Remote output(RY)		
Ver.2 Remote register(RWr)		
Ver.2 Remote register(RWw)		
Special relay(SB)	SB0	
Special register(SW)	SW0	
Retry Count	3	
Automatic Reconnection Station Count	1	
Standby Master Station No.		
PLC Down Select	Stop	
Scan Mode Setting	Asynchronous	
Delay Time Setting	0	
Station Information Setting	Station Information	
Remote Device Station Initial Setting	Initial Setting	
Interrupt Settings	Interrupt Settings	

4.6.2 Applying CSP+ file

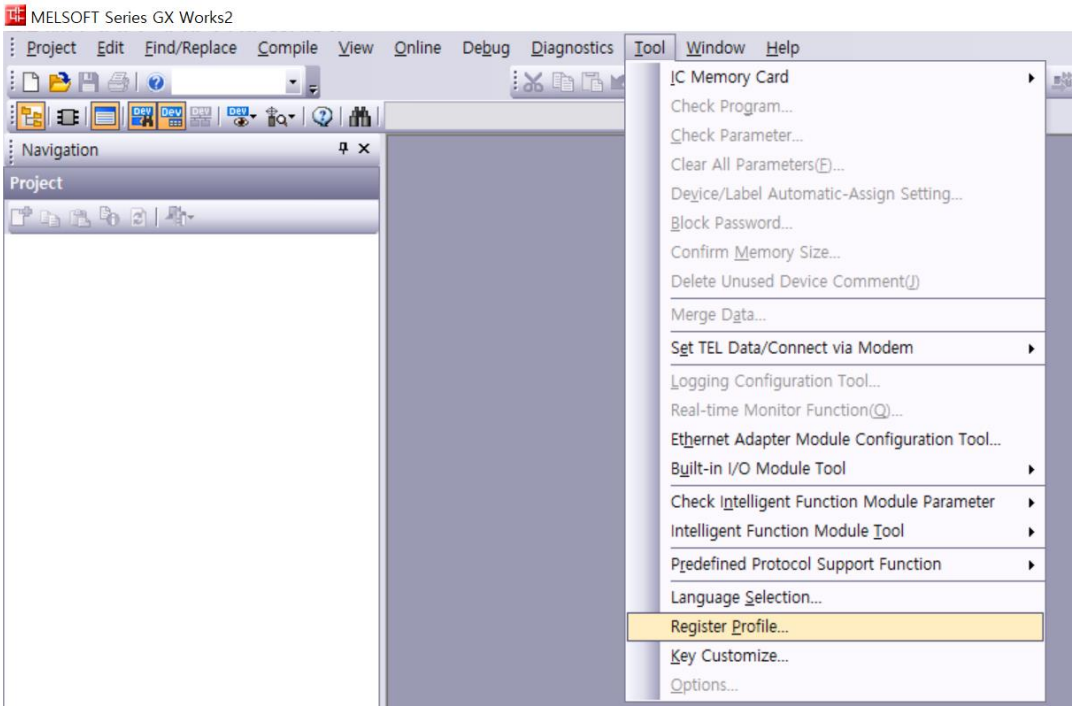
CSP + is an abbreviation of CC-Link Family System Profile Plus. It is an XML data file for displaying the information of the CC-Link and CC-Link IE Field connected devices.
This file contains specification information, I / O information, parameter information, and so on.
In addition, information specific to each network device is provided to the engineering development environment for starting, operating, and repairing the equipment. Since they are written in the same format, they can share the information acquisition process of the device.

① User can download CSP+ file of Ezi-STEPII CC-Link at FASTECH hompage.

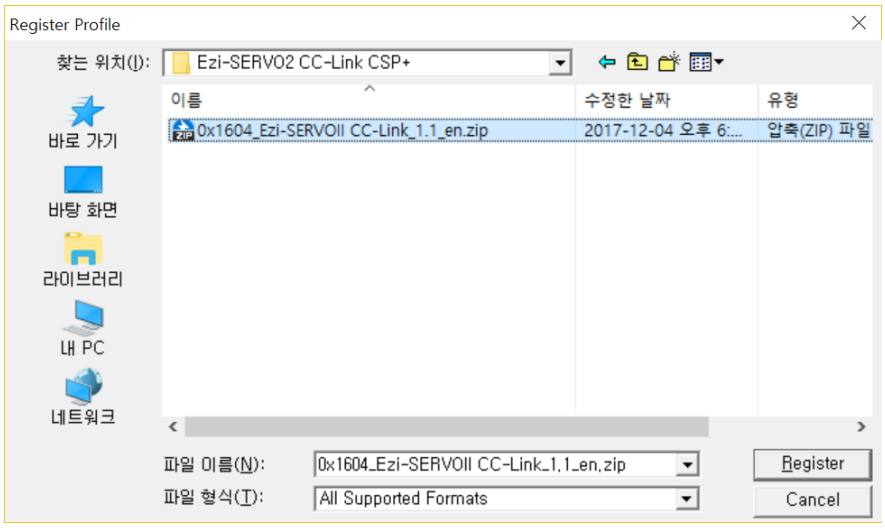
KOR : http://fastech.co.kr/new/board/bbs/board.php?bo_table=sub0302

ENG : http://fastech.co.kr/new/board/bbs/board.php?bo_table=sub0302_en

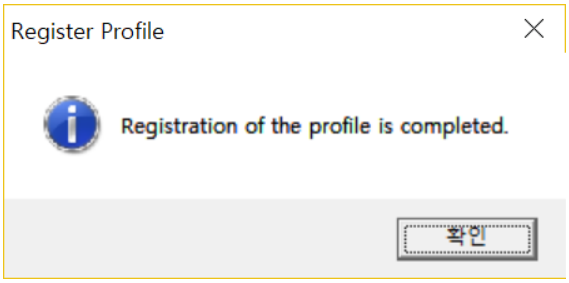
② Select [Tool]-[Register] on GX-Work2. At this time, any project file shoud be not Open.



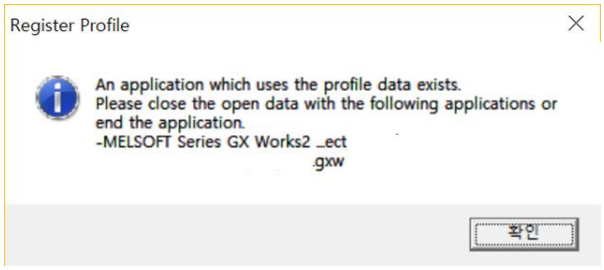
③ Select downloaded file and apply as click "Register" button.



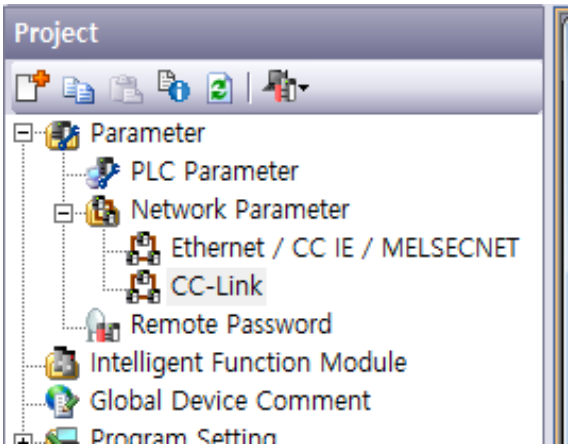
When the application is completed, the following message is displayed.



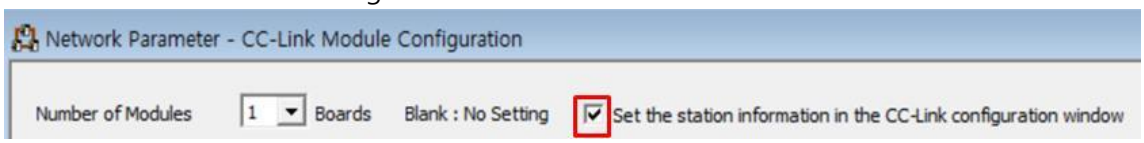
If the project file is open, the following message is displayed.



④ Open a new project file or an existing project file and double-click [Parameter] – [Network Parameter] – [CC-Link] in the PLC program project.



⑤ In the CC-Link Module Configuration window, select the "Set the station information in the CC-Link configuration windows" check box.



⑥ If user system uses CC-Link Ver.1, set it to Remote Net (Ver.1 Mode).

Type	Master Station	
Master Station Data Link Type	PLC Parameter Auto Start	
Mode	Remote Net(Ver.1 Mode)	

However, if user system requires CC-Link Ver.2, set it to Remote Net (Ver.2 Mode).

Type	Master Station	
Master Station Data Link Type	PLC Parameter Auto Start	
Mode	Remote Net(Ver.2 Mode)	

⑦ Set start address of CC-Link remote device.

Remote input(RX)	X1000	
Remote output(RY)	Y1000	
Remote register(RWr)	D1000	
Remote register(RWw)	D2000	

The remote device set in this manual

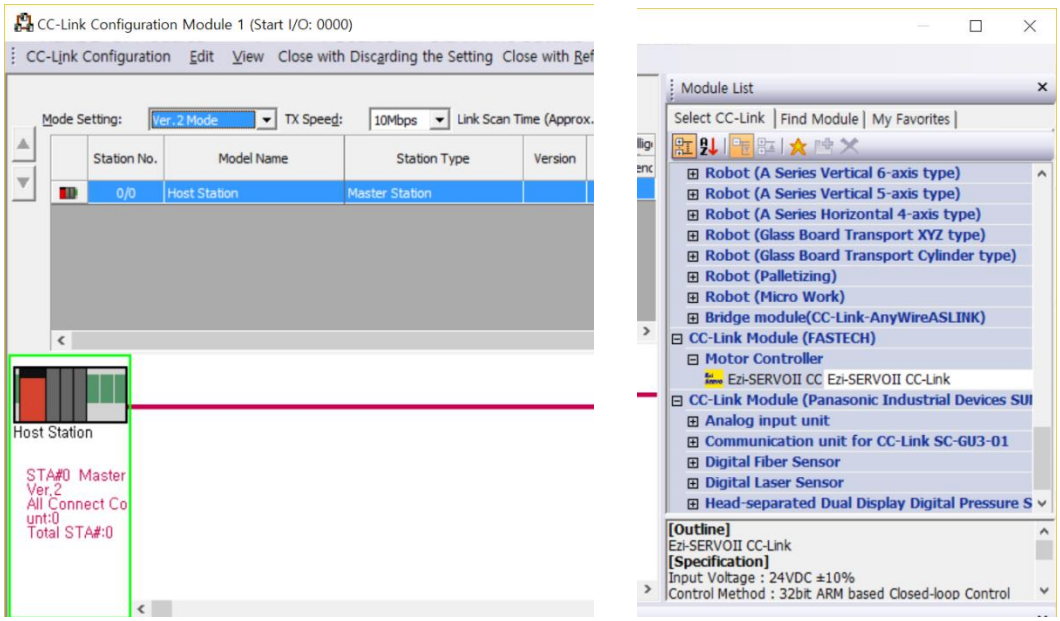
- Remote Input Address (RX) : X1000
- Remote Output Address (RY) : Y1000
- Remote Resister Address (RWr) : D1000
- Remote Resister Address (RWw) : D2000

⑧ Set device information connected in CC-Link network.

Station Information Setting	Station Information	

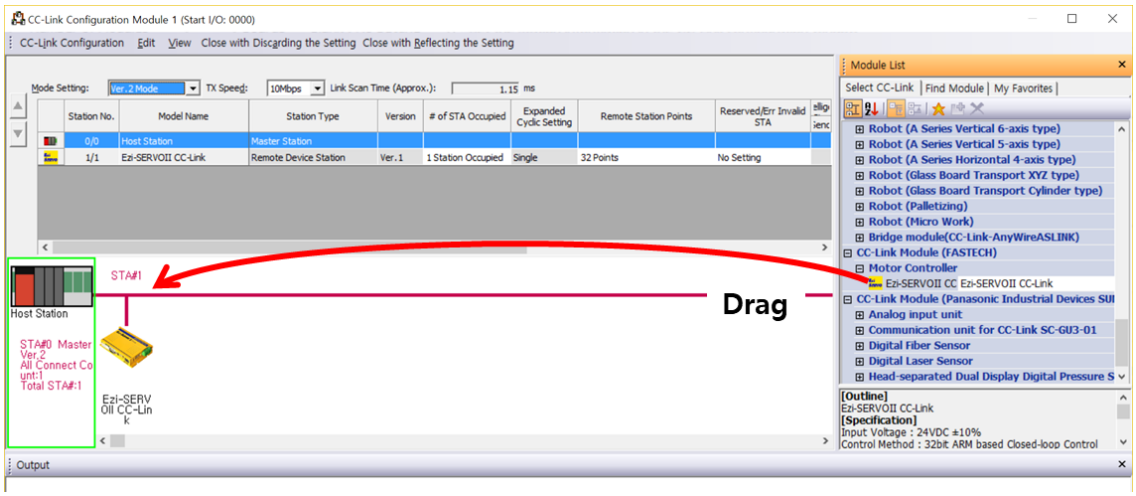
⑨ Set the device information connected to the CC-Link network. At this time, the window to be opened is different from the general setting method.

⑩ Check that Ezi-STEPII CC-Link is included in the left module list.
(If the work of ① ~ ③ is completed normally, it is displayed as below.)

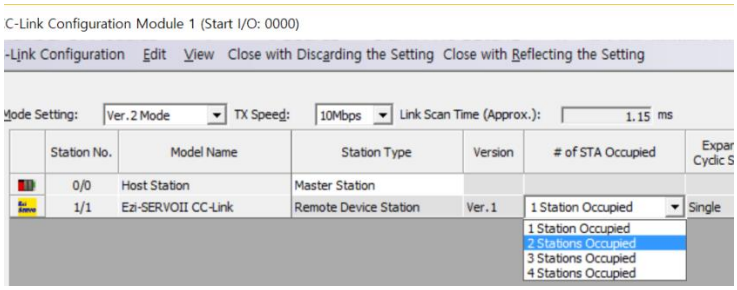


⑪ Click the checked device and drag it as follows to display the device.

If you want to connect more here, you can add as many drags as you need.

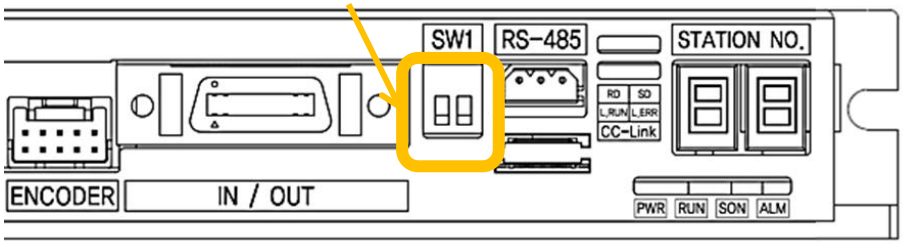


⑫ Set the occupied station in the same way as the setting value of the switch of SW1 of the drive.



Set the switch value of SW1 on the front of Ezi-STEPII CC-Link for the number of stations to be occupied according to the system conditions.

Number of Occupied Station Setting Switch



Switch Information

SW1.2	SW1.1	Occupied station No.
OFF	OFF	1
OFF	ON	2
ON	OFF	3 (No function)
ON	ON	4 (No function)

4.7 Confirmation of handshake

4.7.1 Activating the Drive

Ezi-STEPII CC-Link requests initial data processing when power is turned on. This can be checked by turning on the "Initial Data Processing Request [RY1C]" bit of the remote device.

Ezi-STEPII CC-Link's "Remote station Ready [RX1D]" is ON when the status of "Initial Data Processing Request [RX1C]" is checked in the upper part and "Initial Data Processing Complete [RY1C] "RX1C is ON, then Initial Data Processing Request" turns OFF, and the drive becomes active.

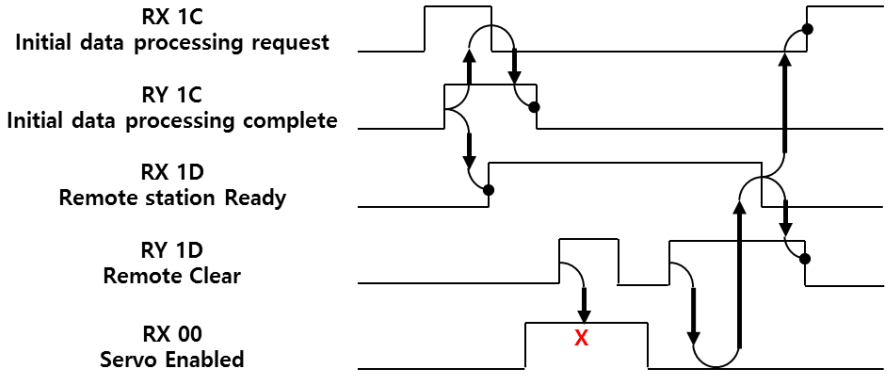
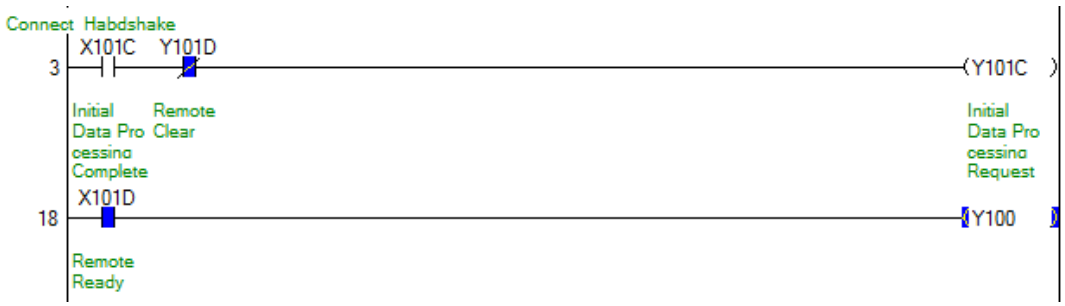


그림 4-8 Confirmation of handshake

The drive can be released with the "Remote Clear [RYD]" set to release the active state. However, to disable the drive, it must be in Servo Off mode. When the remote device output RY00 is turned on or the external input command is Servo On, stop the motion and make the Servo Off state.

4.7.2 Handshake Method

When the start address of Remote Device I / O of CC-Link Data is Y1000, X1000



Attention	Please note that the data when the Remote station Ready bit (RY1D) is not ON is invalid.

4.8 RS485 Control Authority

In case of FA field control, access to other interface except main control device is required. Ezi-STEPII CC-Link supports Ezi-MOTION Plus-R Protocol with RS485 port, so it can be used as a program for motion command and parameter setting of existing Ezi-MOTION PlusR product family.

4.8.1 Approval of Control Authority

Ezi-STEPII CC-Link is an RS485 port that enables basic status monitoring and parameter request commands. These commands can only process commands that are read- only. If you want to modify parameter or motion control to RS485 communication, you can obtain control authority as follows.

① Exit from the CC-Link network by turning off the power of the master controller or disconnecting the CC-Link cable from the drive.

- Execute all supported commands

② Turn on "RS485 Approval of use [RY1E]" to acquire control authority

- No authority for Servo On / Off control

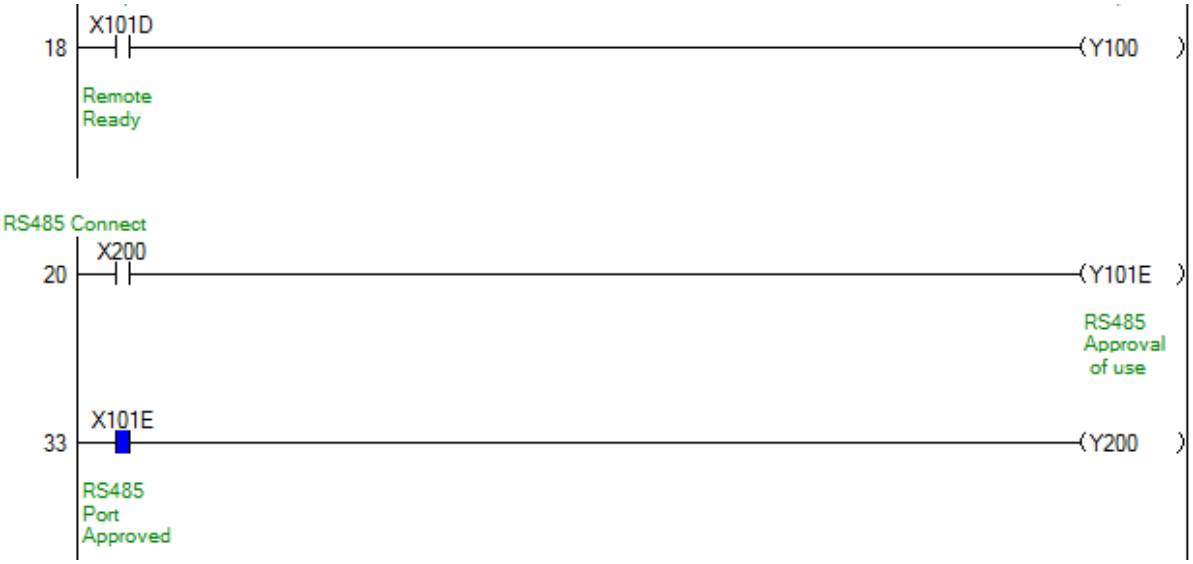
③ Disable drive (set "Remote station Ready [RX1D]" to Off)

- Execute all supported commands

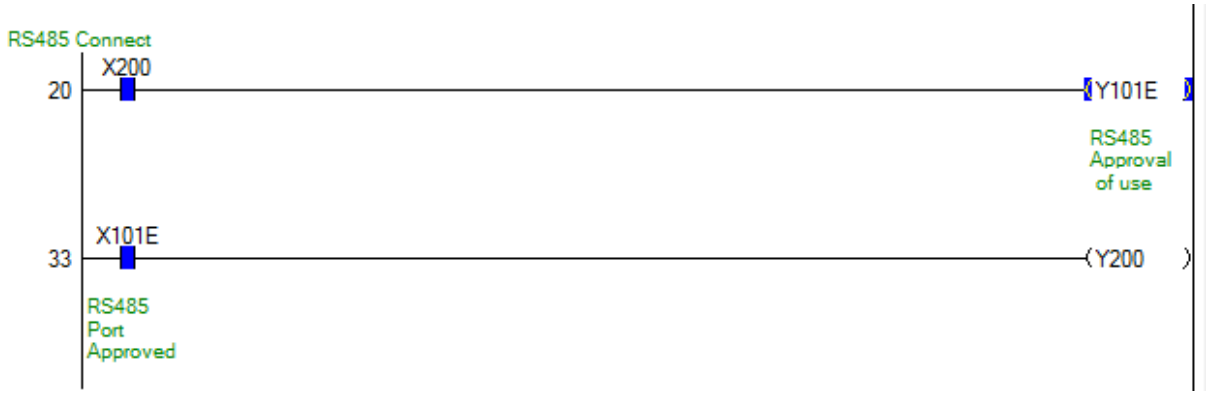
4.8.2 Approval of Control authority check and RS485 communication status

The control authority for RS485 communication is approved when "[RX1E] RS485 Port Approved" is ON. The conditions under which this device turns ON are as follows.

① When "Remote station Ready [RX1D]" is off state



② When "[RY1E] RS485 Approval of use" is On state



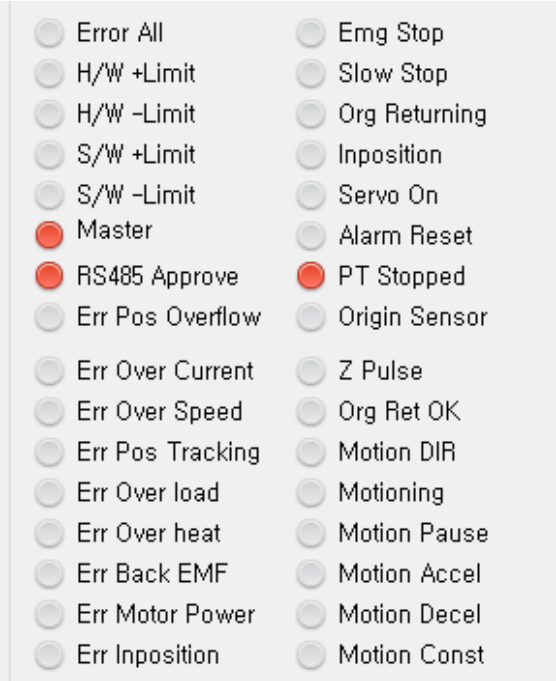
4.8.3 RS485 communication connection flag

The master controller can check whether the command is being received by RS485. At this time, the Ezi-MOTION PlusR protocol will stay on for 1 second from the point of the normal processed command.

4.8.4 Status bits in Ezi-MOTION PlusR GUI

Ezi-STEPII CC-Link can check the following status information by executing FZ_GetAxisStatus( ) command which is Ezi-MOTION PlusR Protocol.

The User can check the flag when the connection of the master controller is checked and the flag indicating whether or not control is available through RS485.



- Master bit : When the host controller is detected

- RS485 Approve bit : When user has RS485 control authority

4.9 MOTOR Enable/Disable and Alarm Reset

1) MOTOR Enable/Disable Function

When the MOTOR Enable / Disable signal is OFF, the drive stops supplying current to the motor and the motor becomes free-run. In this state, the position of the rotating shaft of the motor can be adjusted manually. When it is turned on, the drive supplies current to the motor and the holding torque is maintained.

Remote Device

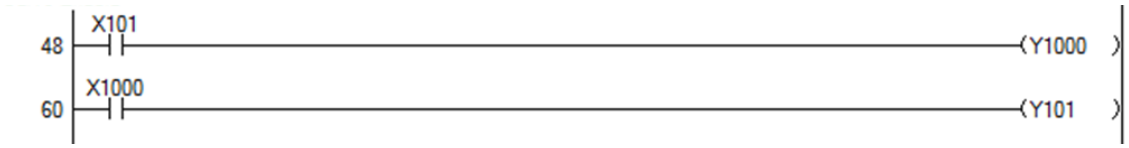
- Remote Input Address (RX) : X1000
- Remote Output Address (RY) : Y1000
- Remote Resister Address (RWr) : D1000
- Remote Resister Address (RWw) : D2000

Mapping Information

Name	Function PLC->Drive	Remote Device Mapping	Condition of using Ext. I/O		
			Mapping Name	[DEC]	[HEX]
MOTOR Enable	Output	Y1000	MOTOR Enable	17	0x11
MOTOR Enabled	Input	X1000	Step On	17	0x11

Device Comment

- User MOTOR Enable Command : X101
- User MOTOR Enabled Status : Y101



Caution	In order to control motor enable command by external input by allocating MOTOR Enable command to external input pin, MOTOR Enable bit of CC-Link I / O map must be kept On.

2) Reason of Alarm / Alarm Reset

When the drive cannot be operated by the internal protection circuit, the drive's protection function is activated and an alarm is output. Alarm confirmation can be confirmed by the 7-segment display in "4.4 Drive Status Display" or by the number of alarm status LED blinking.

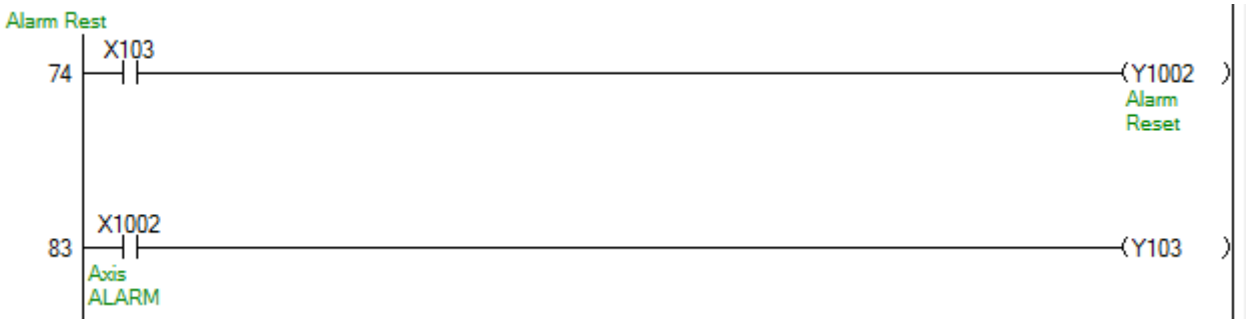
When an alarm occurs, it can be released by rebooting or by the alarm reset command. At this time, the alarm reset should be done after removing the cause of alarm.

Mapping Information

Name	Function PLC->Drive	Remote Device Mapping	Condition of using Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Alarm Reset	Output	Y1002	Alarm Reset	18	0x12
Axis Alarm	Input	X1002	ALARM	18	0x13

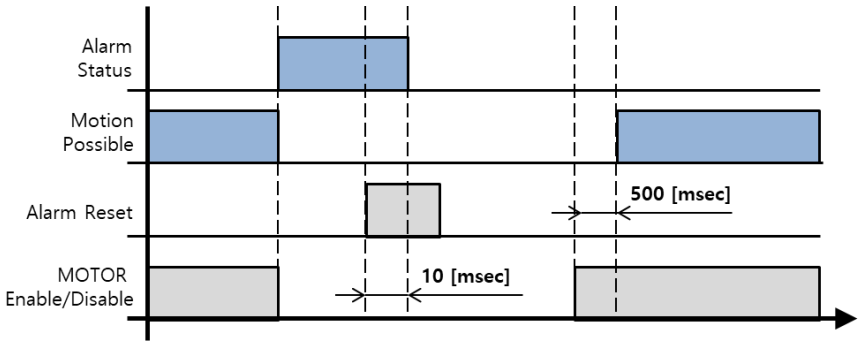
Device Comment

- User Alarm Reset Command : X103
- User Axis Alarm Status : Y103



3) Operation of Servo On/Off and Alarm

If the drive generates an alarm while the motor is running, the motor will stop and automatically became Servo Off. When the alarm clear command is executed, the motor maintains the free-run status. To restart it, execute Servo On command. The operation for this is as follows, and Alarm Reset command should keep the signal more than 2 cycles or 10 [msec].



Picture 4-9. Operation of Servo On/Off and Alarm

4.10 E-STOP (Emergency Stop)

The E-STOP command is an emergency stop command that immediately stops without deceleration. In CC-Link I / O-Map, it operates by low command. When input by external input, it operates according to level setting value.

Mapping Information

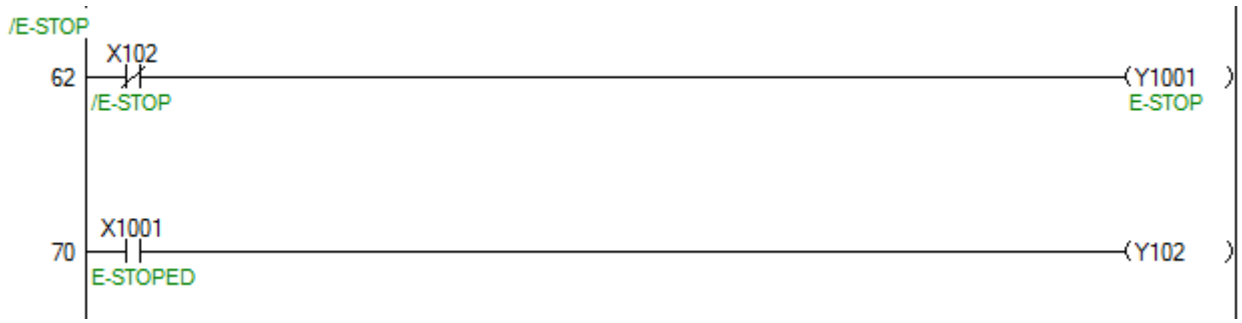
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O using condition		
			Mapping Name	[DEC]	[HEX]
Emergency Stop	Output	Y1001	E-STOP	18	0x10
Emergency Stopped	Input	X1001	-	-	-

Used Parameter

Parameter No.		Parameter Name
GUI No.	Parameter Code	
0	A011	E-STOP Method

Device Comment

- User E-STOP Command : X102
- User Motioning Status : Y102



If the E-STOP command is maintained, no motion command is executed. The operation of the E-STOP command can be changed according to the parameter **Pn # A011h E-STOP Method** when the command is executed.

1) Step On maintained [Pn#A011h = 0]

If the parameter value is set to '0', the motion during E-STOP command will stop suddenly without deceleration and Servo On will be maintained.

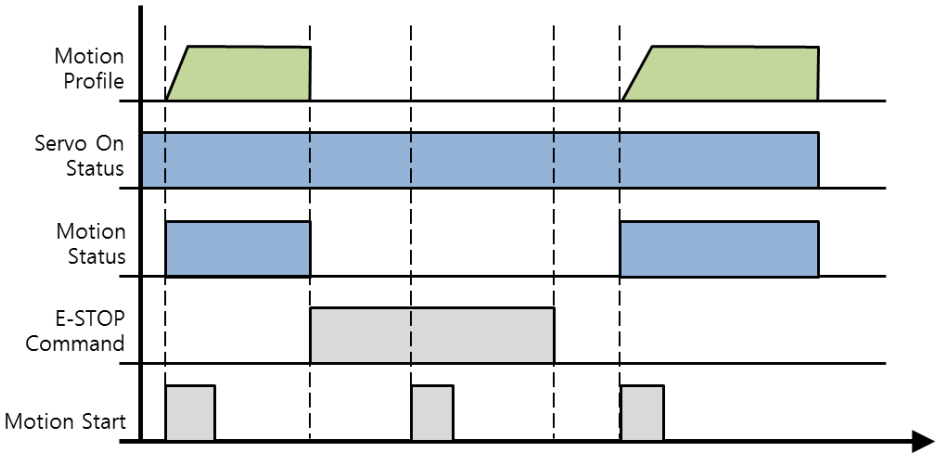


Fig. 4-10. E-STOP Only

2) Executing Step Off [Pn#A011h = 1]

If user set the parameter value to '1' to enable Servo Off, the motion in motion will stop suddenly without deceleration and Servo Off will be enabled.

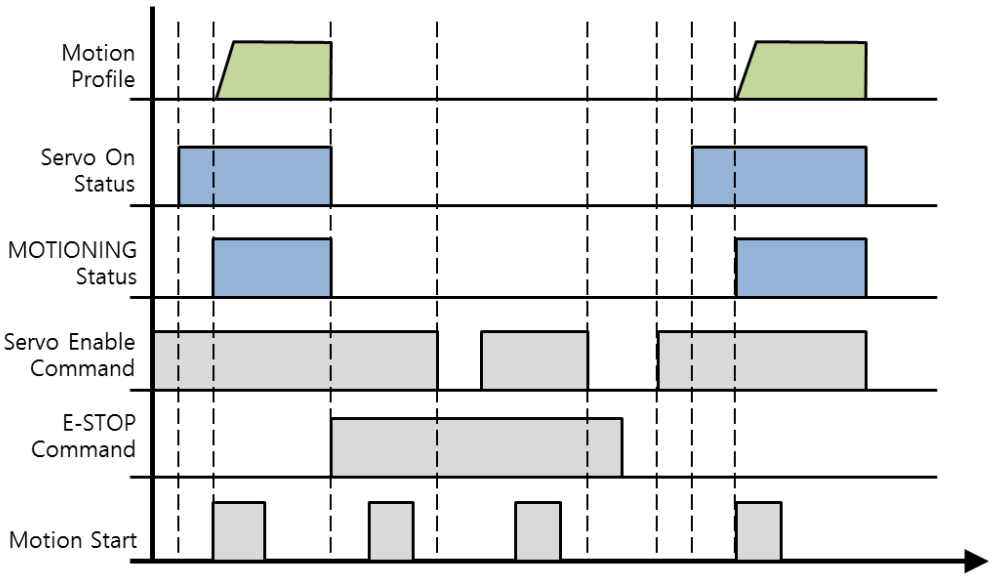


Fig. 4-11. When set to Step Off operation mode

4.11 S-STOP (Slow Stop)

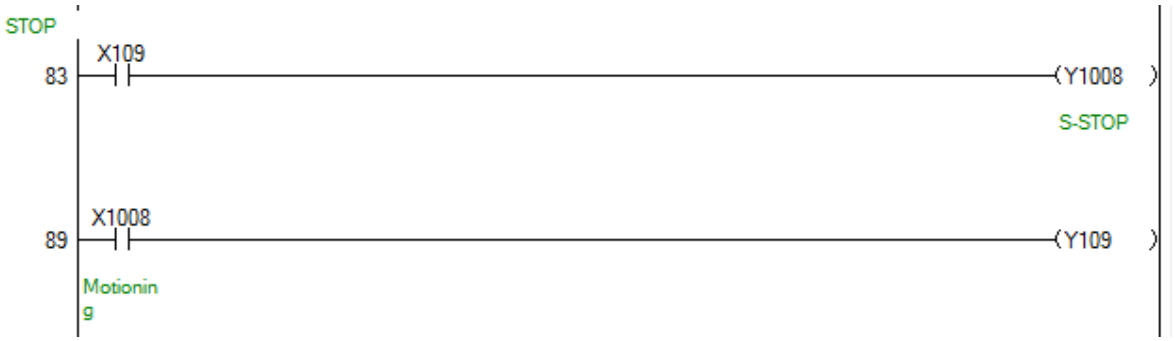
The S-STOP instruction is a general stop instruction that stops the motion profile under the deceleration condition. In CC-Link I / O-Map, it operates by High command. When input by external input, it operates according to the level setting value.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O using condition		
			Mapping Name	[DEC]	[HEX]
S-Stop	Output	Y1008	S-STOP	19	0x13
Motioning	Input	X1008	Motioning	16	0x10

Device Comment

- User STOP Command : X109
- User Motioning Status : Y109



If the S-STOP command is maintained, no motion command can be executed.

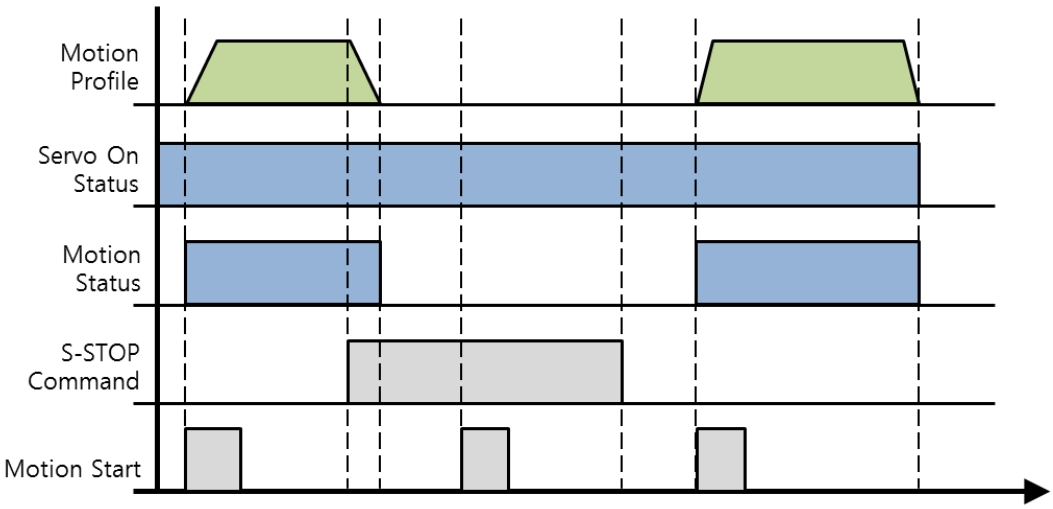


Fig. 4-12. Motion of S-STOP

4.12 Homing Start

Homing start is a command to specify a mechanical origin. To execute the homing start command, search the origin according to the value of parameter "Pn # B200h Homing Method". When this command is executed, Motion Ready is off. Motion Ready is On when the origin move command is canceled or home search is completed.

Mapping Information

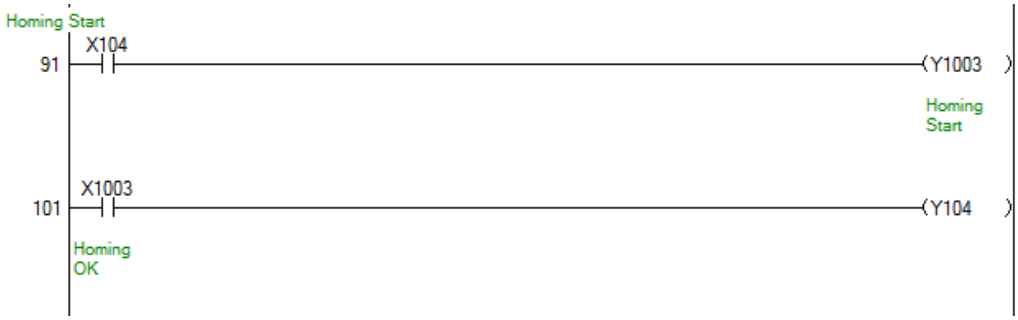
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O using condition		
			Mapping Name	[DEC]	[HEX]
Homing Start	Output	Y1008	Home Search	20	0x14
HOME Search OK	Input	X1008	Homing OK	26	0x1A
MOTION READY	Input	X1004	Motion Ready	20	0x14

Used Parameter

Parameter No.		Parameter Name
GUI No.	Parameter Code	
32	B200	Homing Method
33	B201	Homing Speed
34	B202	Homing Search Speed
35	B203	Homing Acc Dec Time
36	B204	Homing Direction
37	B205	Homing Offset
38	B206	Homing Position Set
68	B208	Homing Start Speed
40	E000	Limit Sensor Logic
41	E001	Org Sensor Logic
63	B208	Homing Start Speed

Device Comment

- User STOP Command : X109
- User Motioning Status : Y109



When returning to the home position, the status flag can be checked as shown in Fig. 4-15.

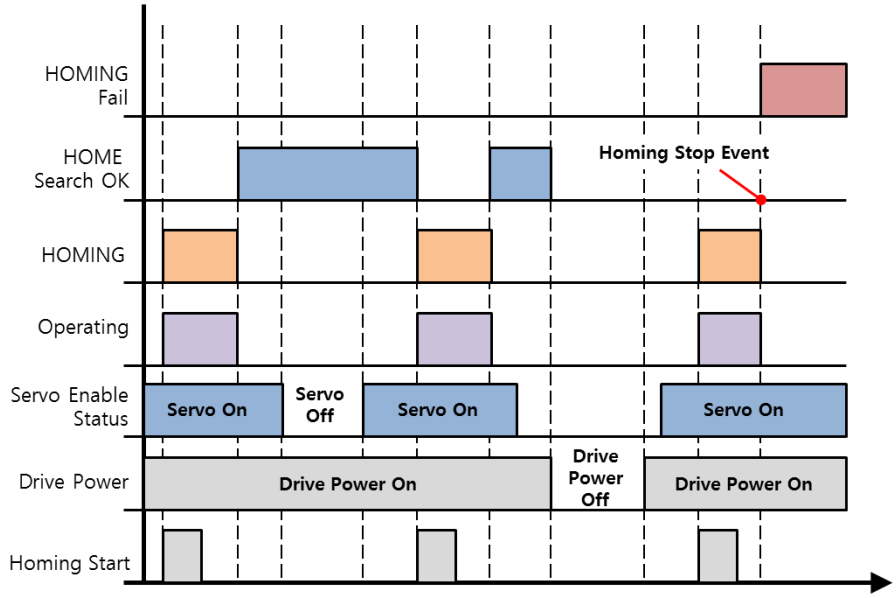


Fig 4-13. State flag of home move command

When homing start command is issued, HOMING, which is the process of operating the drive according to the origin method of Pn # B200, is executed. When home search is completed during this operation, Home Search OK flag turns on.

A flag indicating that home movement has been completed. The Home Search OK flag remains ON even when the servo is off. However, when a new home return command is executed or the drive is re-booted, the Home Search OK flag turns OFF

⚠ **Attention**	Homing Fail state in which origin movement stops when Servo Off, Stop command, H / W Limit signal which is unnecessary for origin method is detected during home position movement.

⚠ **Attention**	Homing Search Fail is not a status flag on the drive. The homing start failure condition is that the homing flag is ON by executing Homing start command, and Homing flag is OFF when Home Search OK is not ON.

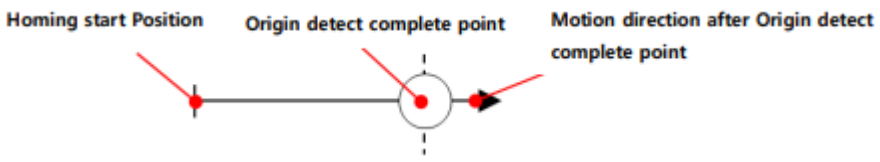
The input signals used to find the origin are Origin, Limit +, Limit-Sensor and Z-Phase signal which is the index pulse of the encoder. This uses signals differently according to the Homing Method (Pn # B200h) parameter.

Pn#B200h : Homing Method

Method Number.	Method Type
0x00	Homing profile of "Origin"
0x01	Homing profile of "Z-Origin"
0x02	Homing profile of "Reverse Side Origin"
0x03	Homing profile of "Reverse Side Z-Origin"
0x04	Homing Profile of "Limit Origin"
0x05	Homing Profile of "Z Limit Origin
0x06	Homing Profile of "Z Phase"
0x09	Set Origin

※ Setting of homing method

- To execute home return, parameter "Pn # B200: Org Method" must be set.
- The arrows in the figure indicate the direction of movement after the detection of home position is completed.
- In the figure, ○ is the origin detection position.
- λ The number in ○ indicates the position of the sensor dog or the example number according to Org Dir.
- In Z-pulse homing method, Z-pulse homing is repeated twice at a speed of 10 [pps] (fixed speed) after completion of low homing of Parameter Homing Search Speed (Pn # B202h) Complete the return. (This method is for accurate Z-pulse Zero point return.)



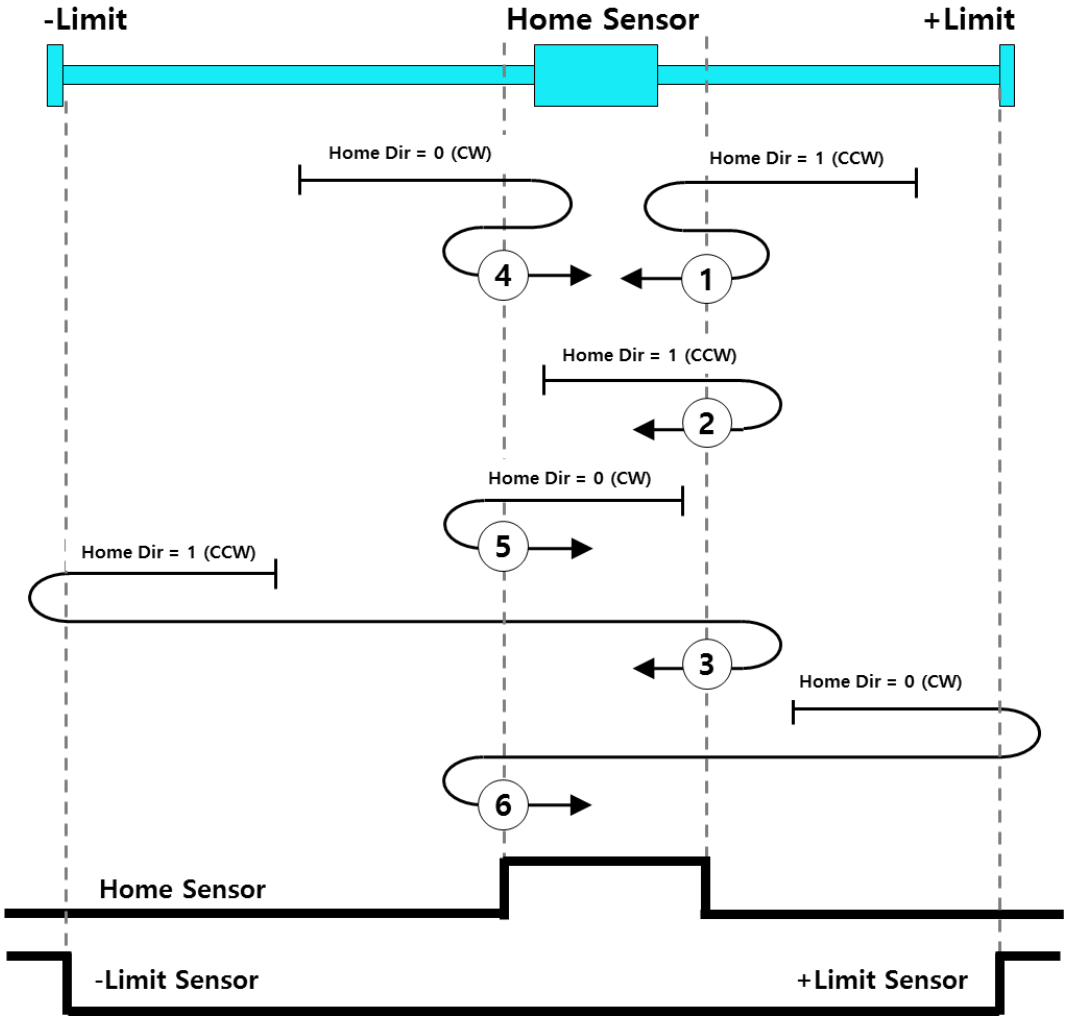
⚠ **Attention**	When the H / W Limit input is done, the home position is moved by the Z-phase method or Torque Org method, the homing command is canceled.

4.12.1 Homing Method : Origin (0x00)

The origin return method by the origin sensor is the method in which the origin detected when the sensor dog is approached to the home sensor.

Homing operation ①, ③, ④, ⑥ is when sensor dog is between Origin and Limit sensor. At this time, if the Limit sensor is detected earlier than the origin sensor as in the home return operation ③ and ⑥, it moves in the direction opposite to the limit and detects the origin sensor and is designated as origin. If the opposite limit sensor is detected by moving in the direction opposite to the limit, Homing will fail, so check whether the home sensor is operating.

Homing operation ②, ⑤, is when the sensor dog exists in the origin sensor, moves in the direction opposite to the homing direction and designates the proximity position of the sensor as origin.

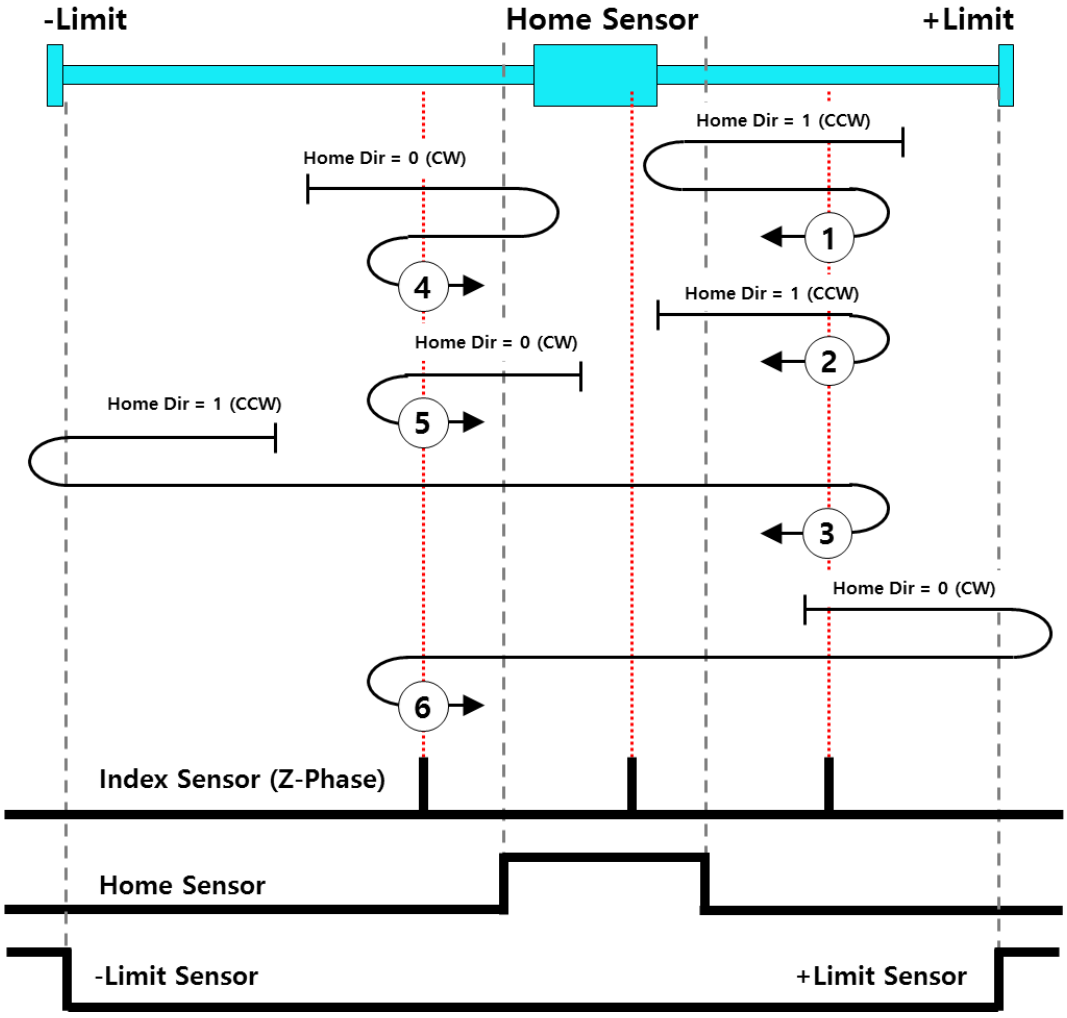


4.12.2 Homing Method : Z Origin (0x01)

The homing method by Z phase input signal after home sensor detection is to designate the home position where the Z phase input signal of encoder detected after execution of home sensor return method is detected.

The homing operation ①, ③, ④, ⑥ is when the sensor dog is between the origin and limit sensor. It operates as same as homing method by home sensor until home sensor is detected. At this time, all Z-phase input signals before the home sensor is detected are ignored and the first Z-phase input signal after the home sensor is detected is designated as origin.

Homing operation ②, ⑤, is the case where the sensor dog exists in the origin sensor, moves in the direction opposite to homing direction, and the first Z-phase input signal after completely deviating from the input range of the origin sensor is set as origin specified



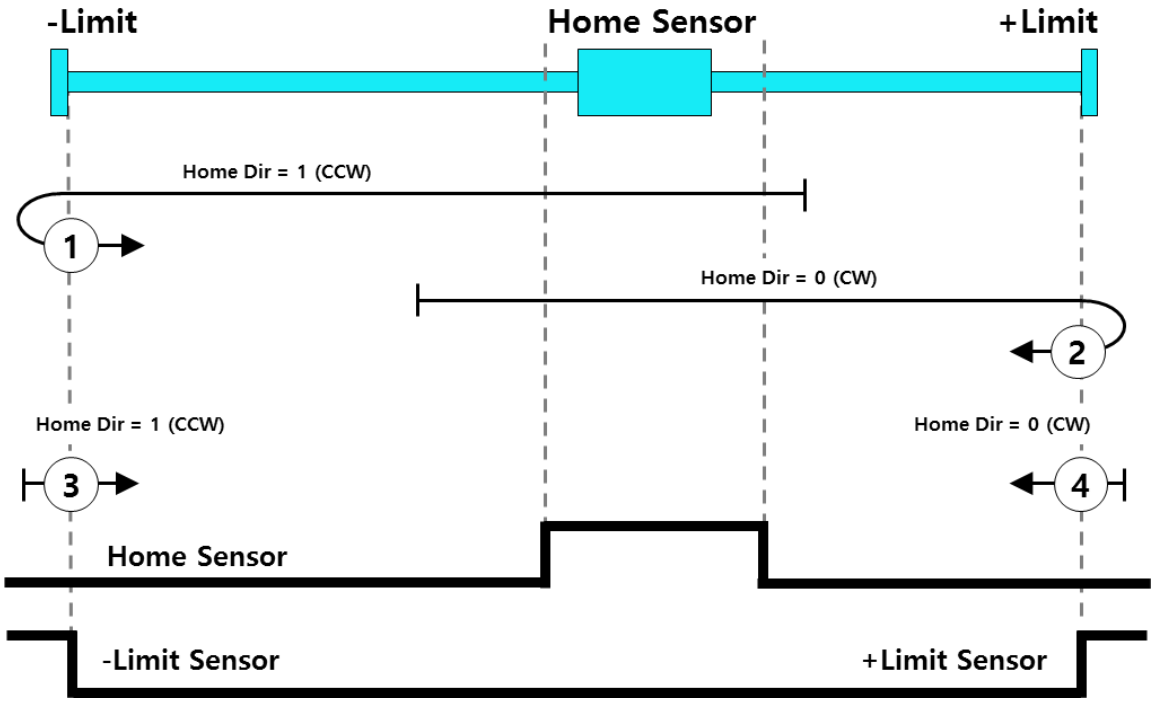
Attention	If the H / W Limit input occurs when moving the home position in the Z-Phase mode, the Homing command is canceled.

4.12.3 Homing Method : Limit Origin (0x02)

The homing method based on the limit input signal specifies the position where the limit sensor is detected as the home position.

Homing operation ① and ② are within the operating range, and specify the origin where the Limit input signal in origin direction is detected. Even if the input signal of the origin sensor or the limit input signal in the opposite direction is detected before the Limit input signal in the direction of origin is detected, it is ignored and the origin where the Limit input signal in the origin direction is detected is the origin.

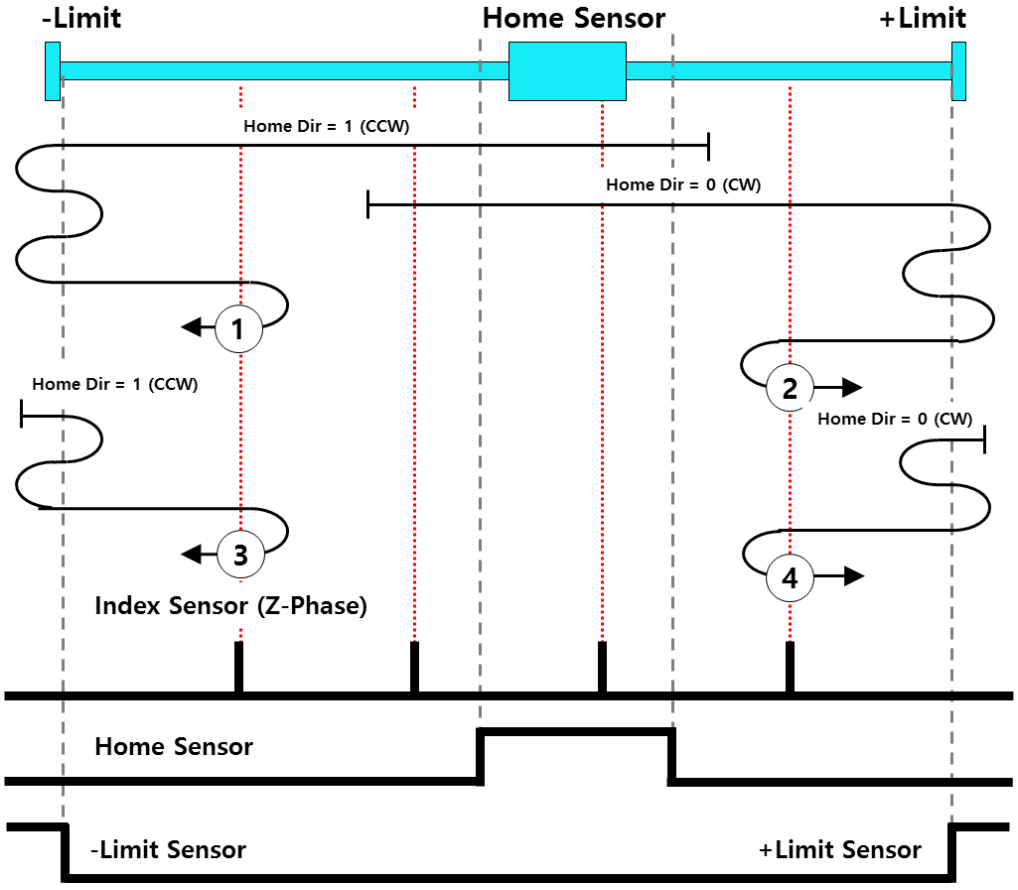
The homing operation ③ and ④ are the origin when the Limit input signal in origin direction is detected and the limit input section is completely deviated from the origin.



4.12.4 Homing Method : Z Limit Origin (0x03)

The zero point return method based on the Z phase input signal after the limit input signal is detected is designated as the origin point where the Z phase input signal of the encoder detected after the return method by the limit input signal is executed . This method detects Limit signal twice, unlike Homing method by Limit input signal. This is because when the limit signal is detected, there is a case where the input signal matches the Z phase. To detect this, the limit signal is detected twice and the Z phase signal is searched. Homing operation ① and ② operate within the operating range until the Limit input signal is detected as same as Homing method by Limit input signal. At this time, the Z-phase input signal before the limit input signal is detected is ignored, and the limit input signal is detected and the point of the Z-phase signal detected for the first time in the opposite direction to the origin is set as the origin.

The homing operation ③ and ④ are the origin of the Z phase signal which is completely excluded from the input range of Limit and detected first from the direction opposite to the origin, when limit input signal of origin is detected.



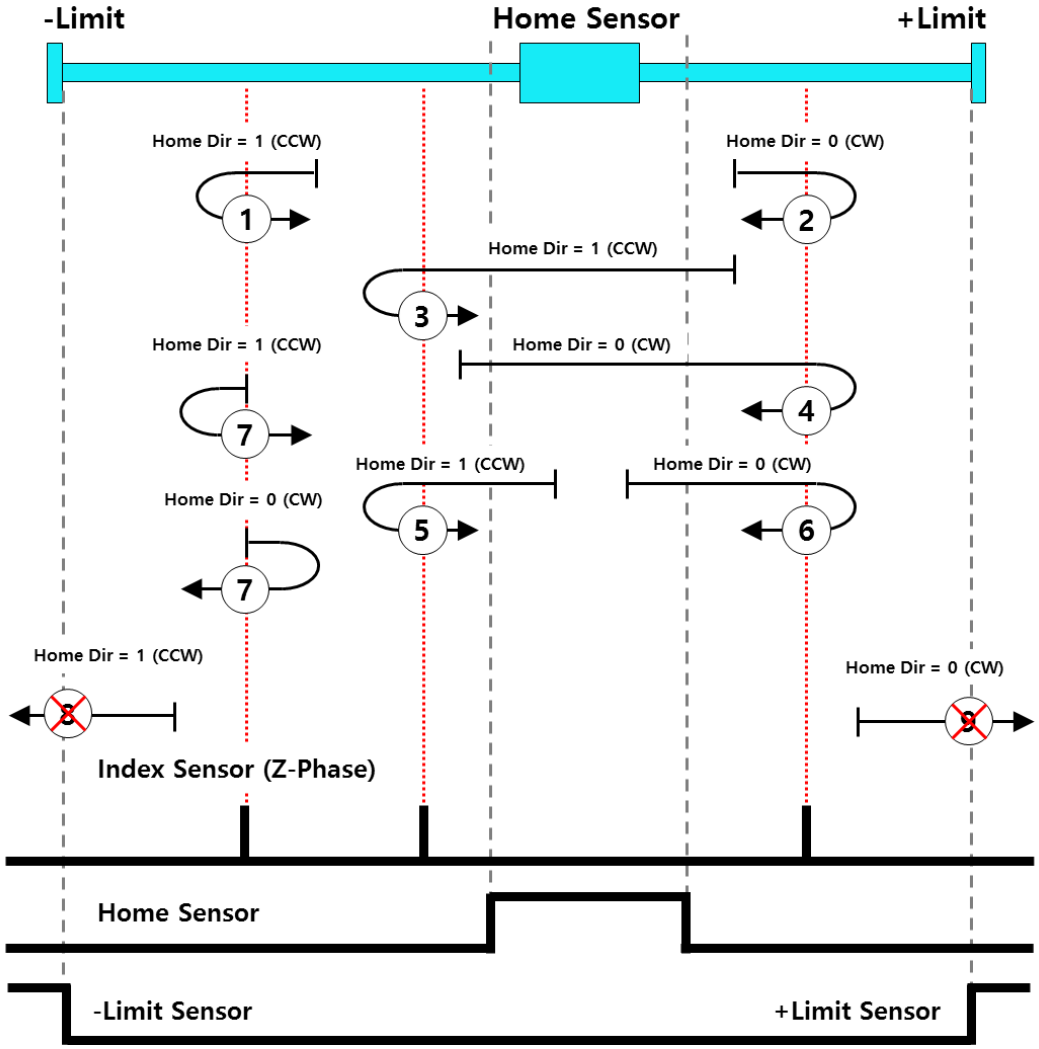
⚠ **Attention**	If the H / W Limit input occurs when moving the home position in the Z-Phase mode, the Homing command is canceled.

4.12.5 Homing Method : Z-Phase (0x04)

Z-phase input method is to return Z-phase signal, which is detected once by 1 [pulse] per rotation of encoder, as origin point.

Homing operation ①, ②, ③, ④ is to move the origin of Z-phase signal to the home position for the first time. At this time, Even if the home position signal is detected as in steps (3) and (4), it is ignored and the first detected Z phase signal is designated as the home position. However, if the limit signal is detected before the Z phase is detected as in steps (8) and (9), the home return operation is canceled.

Homing operation ⑦ is a condition that Z phase is detected. When Homing command is executed in this state, 1 [pulse] is moved in the direction of origin and then it returns to Z phase position again and homing designation is completed



⚠ **Attention**	If the H / W Limit input occur when moving the home position in the Z-Phase mode, the Homing command is canceled.

4.12.6 Homing Method : Set Origin (0x05)

The origin setting command sets the current encoder position to the mechanical origin. Origin sensor, H / W Limit signal and Z-phase signal are ignored when origin setting command. Also, when executing this command, it must be in Servo On state.

Attention	The Set Origin method sets the current position information to 0 in the same way as the Clear Position command, but in the Set Origin method, it can check that the Home OK flag is set to On.

4.13 Jog Operation

4.13.1 Jog Operation

Jog operation is a motion command that moves to the limit point while the command is maintained. Motion Ready is off when this command is executed.

Mapping Information

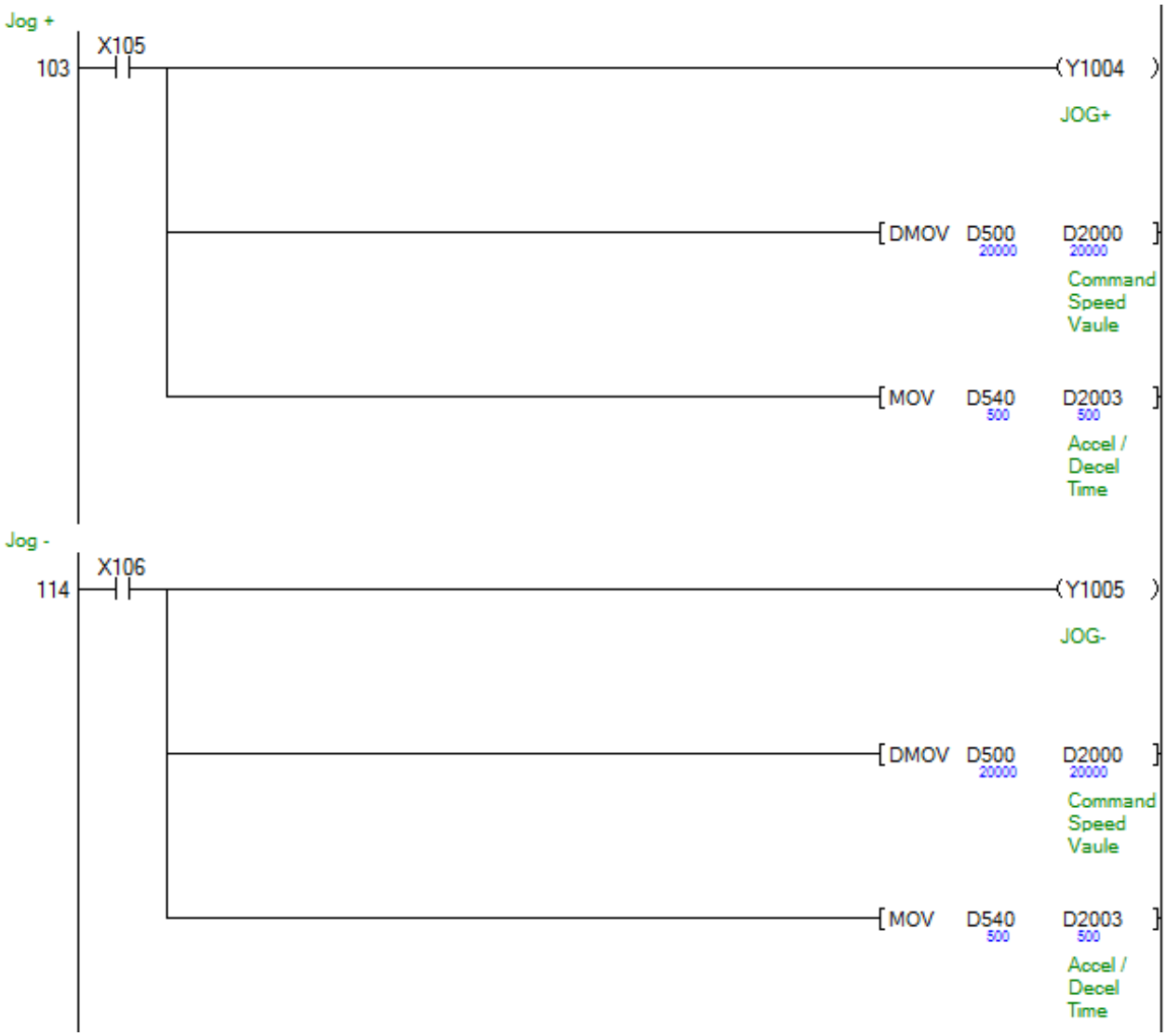
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O using condition		
			Mapping Name	[DEC]	[HEX]
JOG +	Output	Y1004	JOGP	22	0x16
JOG -	Output	Y1005	JOGN	23	0x17
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Speed	Output	D2000	Pn#B105 Jog Speed		
Acc/Dec Time	Output	D2003	Pn#B107 Jog Acc Dec Time		

Used Parameter

Parameter No.		Parameter Name
GUI No.	Parameter Code	
0	A011	E-STOP Method
2	B000	Pulse Per Resolution
3	B001	S/W +Limit Value
4	B002	S/W -Limit Value
5	B003	S/W Limit Stop Method
6	B004	H/W Limit Stop Method
8	B008	Motion Dir
28	B104	Speed Override
29	B105	Jog Speed
30	B106	Jog Start Speed
31	B107	Jog Acc Dec Time

Device Comment

- User JOG+ Command : X105
- User JOG- Command : X106
- User operation speed : D500
- User Acc/Dec time : D540



If the acceleration / deceleration time value assigned to the remote device is not within the range of 1 ~ 9,999 when executing the jog operation command, the acceleration / deceleration time of the motion profile of the jog command becomes the value of Pn # B107 Jog Acc Dec Time.

If the command is canceled during jog operation, it stops at S-STOP from the point at which it is released. This command can be used on systems that require continuous movement.

1) Command maintenance : Normal movement

   While the jog operation command is maintained, the motion moves to the limit point.

2) Command cancel during movement : Move stop

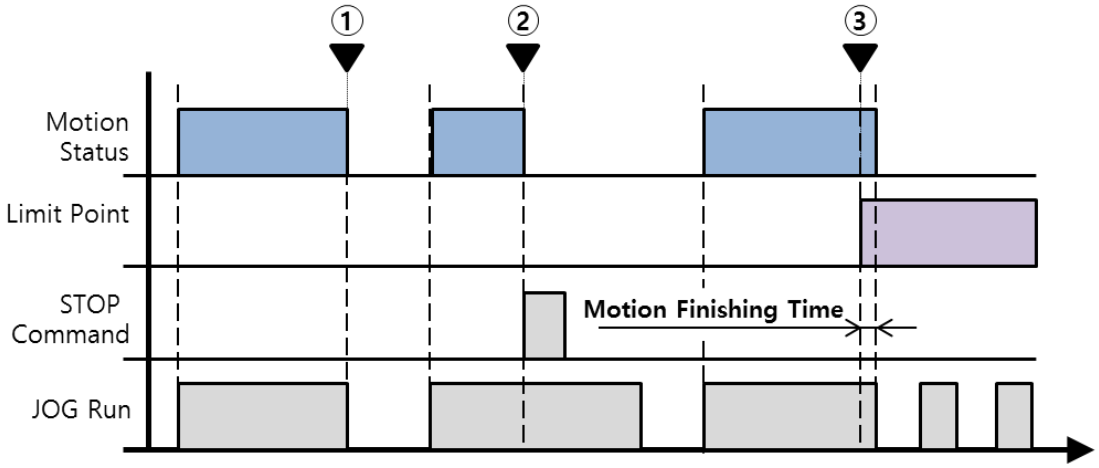
   If the command is canceled during jog operation, it will stop at the point of ①.

3) Stop while moving Command : Cancel command

   During jog operation, S-STOP or E-STOP is executed at the time when the stop command is input.

4) Limit reached during movement : not moveable

   When the limit is reached during the motion, it will stop according to the stopping method for the limit.



The limits of jog operation are H / W limit signal and S / W limit value. When the limit is reached, it stops at E-STOP or S-STOP condition by Parameter Pn # B003 S / W Limit Method and Pn # B004 H / W Limit Method.

⚠ **Attention**	What happens when the motor is running at high speed - If user set to stop by E-STOP, alarm may occur - When stopping at S-STOP, exceeding the limit, mechanical collision possible

4.13.2 Speed override for jog operation

Jog speed override is a command to execute the speed change command during jog operation. When the speed override command is executed, the movement speed profile is changed and moved in the initially started motion profile.

Mapping Information

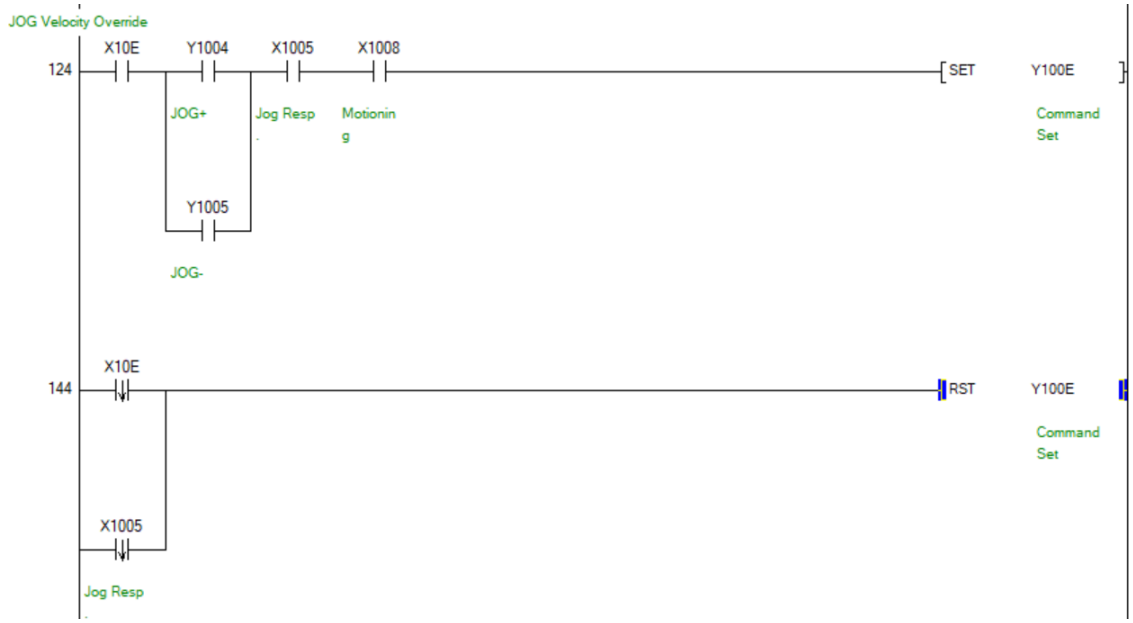
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O using condition		
			Mapping Name	[DEC]	[HEX]
JOG +	Output	Y1004	JOGP	22	0x16
JOG -	Output	Y1005	JOGN	23	0x17
Command Set	Output	Y100E			
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Speed	Output	D2000	Pn#B105 Jog Speed		
Acc/Dec Time	Output	D2003	Pn#B107 Jog Acc Dec Time		

Used Parameter

Parameter No.		Parameter Name
GUI No.	Parameter Code	
0	A011	E-STOP Method
2	B000	Pulse Per Resolution
3	B001	S/W +Limit Value
4	B002	S/W -Limit Value
5	B003	S/W Limit Stop Method
6	B004	H/W Limit Stop Method
9	B007	Position Tracking Limit
8	B008	Motion Dir
12	B00A	Pos. Error Overflow Limit
28	B104	Speed Override
29	B105	Jog Speed
30	B106	Jog Start Speed
31	B107	Jog Acc Dec Time

Device Comment

- User JOG+ Command : X105
- User JOG- Command : X106
- User JOG Velocity Override Command : X10E
- User operation speed : D500 (Operation speed of Jog move command)
- User Acc/Dec time: D540 (Acc/Dec time of Jog move command)



When in motion by executing jog operation command, override command should be executed. And after jog operation command is finished, override command should be released.

Jog operation speed override command can be executed in jog operation status. Operation speed is maintained even when this command is releaseD.

1) Command maintenance : Normal movement

   While the override command is being held, the speed is changed at the speed change time ②.

2) Command cancel during movement : Normal movement

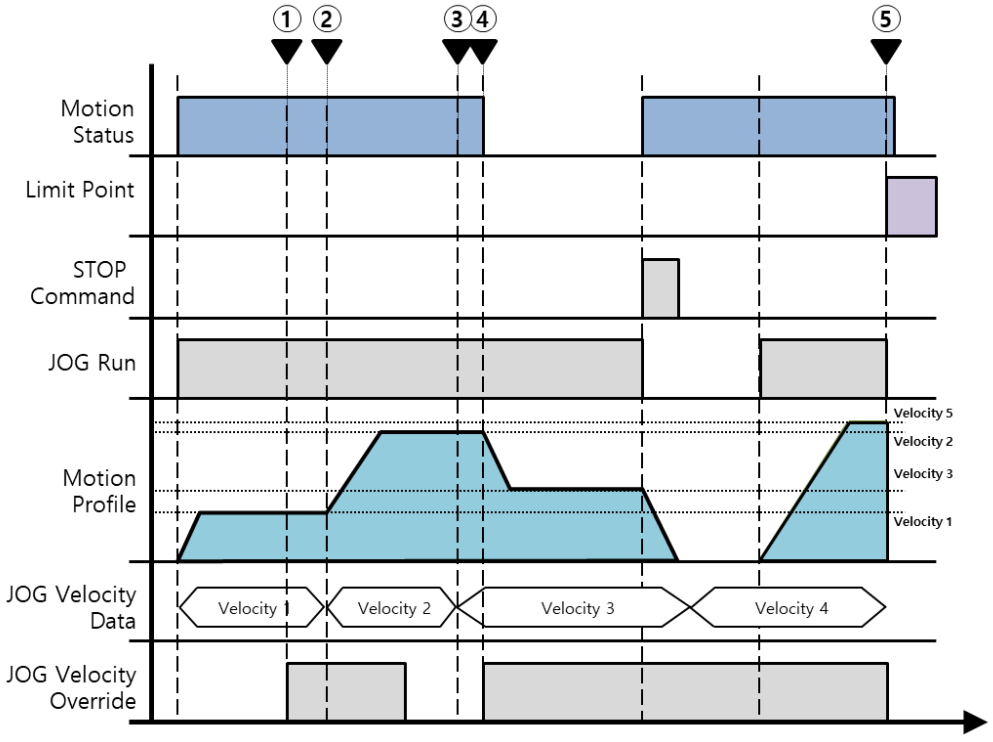
   Even if the command is canceled during operation, the running speed does not change. If the speed is not changed at the point of time when there is no command, the speed is not applied.

3) Stop command while moving : Cancel command

   Motion is stopped when a stop command is input during operation.

4) Limit reached during movement : not moveable

   When the limit is reached during the motion, it stops the same as the jog operation.



If the limit is reached during the override operation, it operates the same as the jog operation.

Attention	For the speed change during jog operation, refer to the speed override of jog operation in "Motion Profile".

4.14 Step Move

A step move is a command that moves as much as entered position value while the command is maintained. If the instruction is canceled during step movement, it is stopped at S-STOP from the point at which it is released. This command can be used in positioning or teaching.

Mapping Information

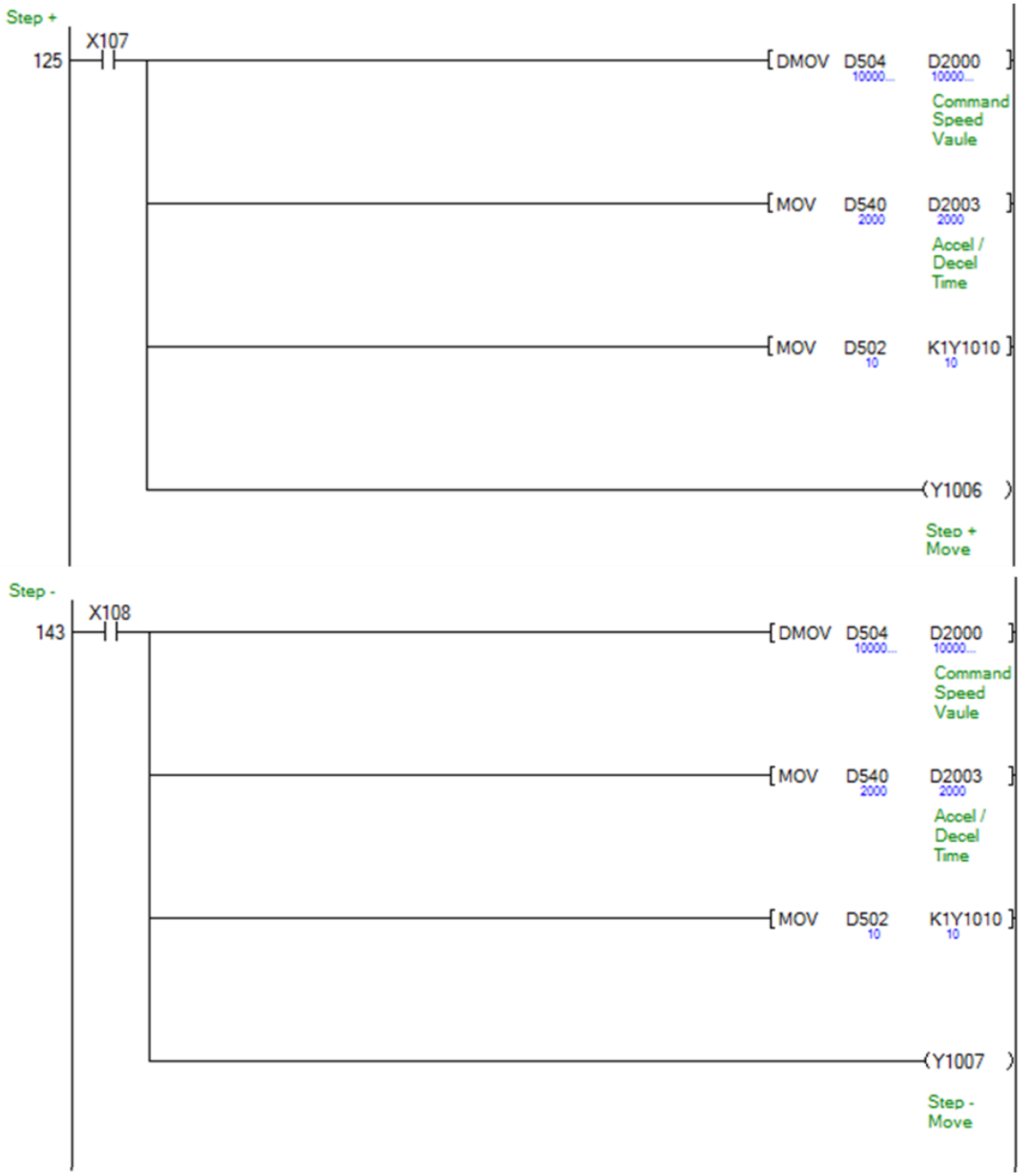
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
STEP +	Output	Y1004	JOGP	22	0x16
STEP -	Output	X1005	JOGN	23	0x17
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Distance	Output	D2000	Pn#B105 Jog Speed		
Acc/Dec Time	Output	D2003	Pn#B107 Jog Acc Dec Time		

Used Parameter

Parameter No.		Parameter Name
GUI No.	Parameter Code	
0	A011	E-STOP Method
2	B000	Pulse Per Resolution
3	B001	S/W +Limit Value
4	B002	S/W -Limit Value
5	B003	S/W Limit Stop Method
6	B004	H/W Limit Stop Method
8	B008	Motion Dir
19	B030	Step Move Position Magnify
25	B105	Jog Speed
26	B106	Jog Start Speed
27	B107	Jog Acc Dec Time
24	B104	Speed Override

Device Comment

- User Step + Move Command : X107
- User Step - Move Command : X108
- User operation speed : D504
- User Acc/Dec time: D540
- Step movement distance : D502



1) Maintaining command : Normal movement

While the step move command is maintained, the motion reaches the target position ①.

2) Command cancel during movement: Stop movement

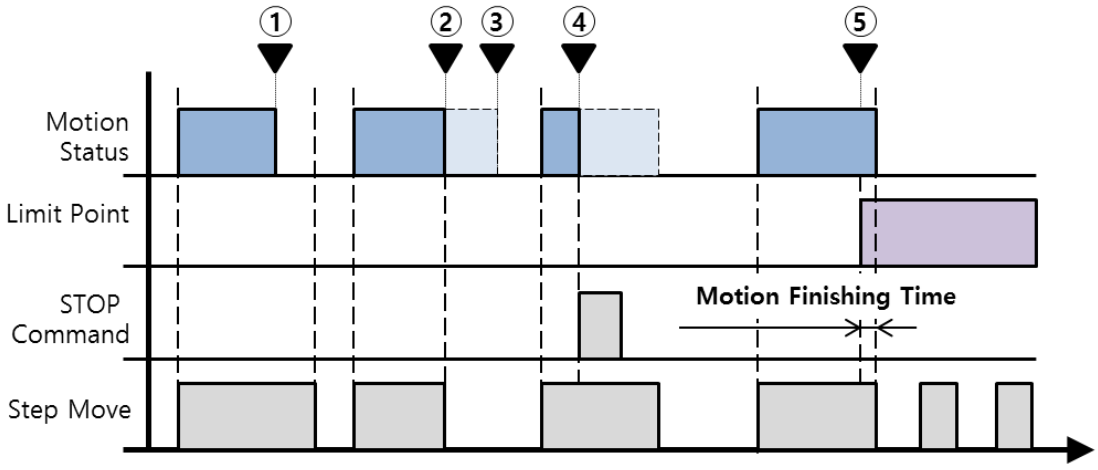
If the command is released during the step movement, the target position ③ is not reached and stops at the position.

3) Command stop while moving: Cancel command

Execute S-STOP or E-STOP at ④ when the stop command is input during step movement.

4) Limit reached during movement: not moveable

When the limit of motion is reached, it stops according to the stop method for the limit.

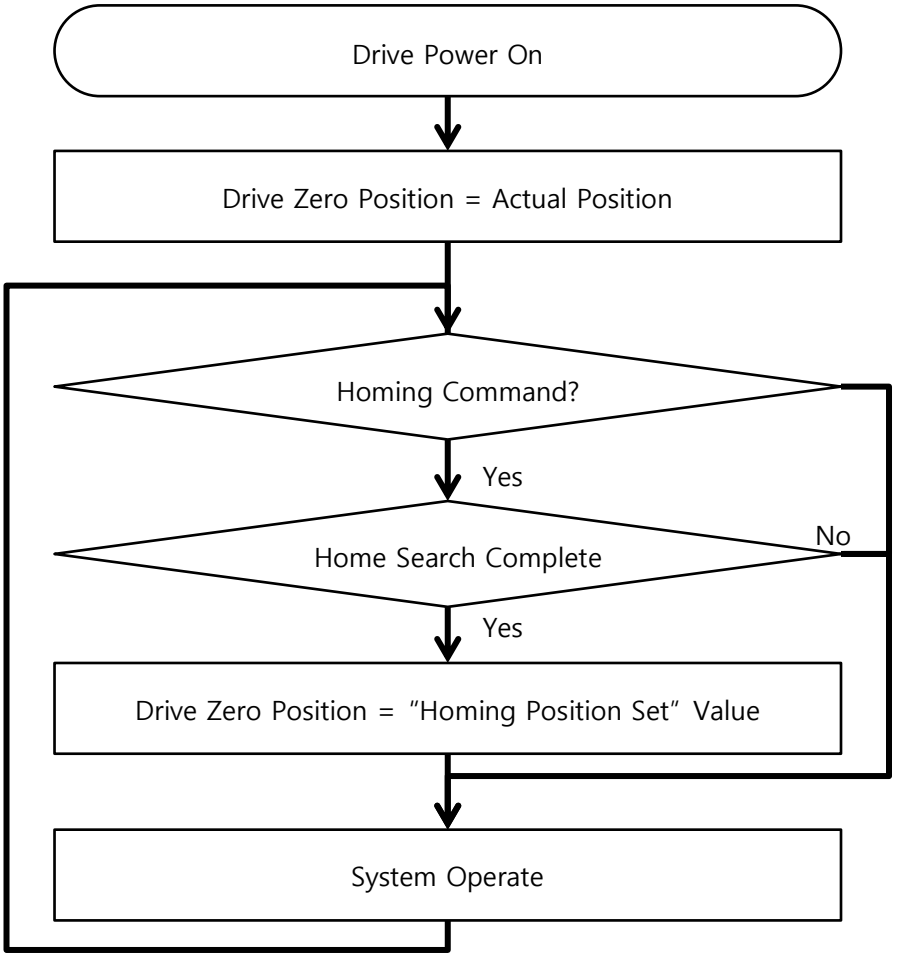


Limitations of step movement include H / W limit signal and S / W limit value. When the limit is reached, it stops at E-STOP or S-STOP condition by Parameter Pn # B003 S / W Limit Method and Pn # B004 H / W Limit Method.

4.15 Zero Position Move

Zero position movement is a position move command that moves to the drive zero position in the drive.

The point at which the drive is designated as the zero point is the initial encoder position (Incremental Encoder 0 [pulse]) at the point when power is supplied to the drive as the zero point of the drive. Homing Position Set (Pn # B206h), which is a Homing Parameter, becomes the drive's zero point (Drive Zero Position) when it completes normally after executing homing command. However, if homing command is executed again after homing has been completed, if homing command is canceled, it becomes homing position set value at homing. The processing of the zero point position of the drive is as follows. Also, even if you change the Homing Position Set value with the parameter setting, the zero point position of the drive will not be changed until homing is executed.



Mapping Information

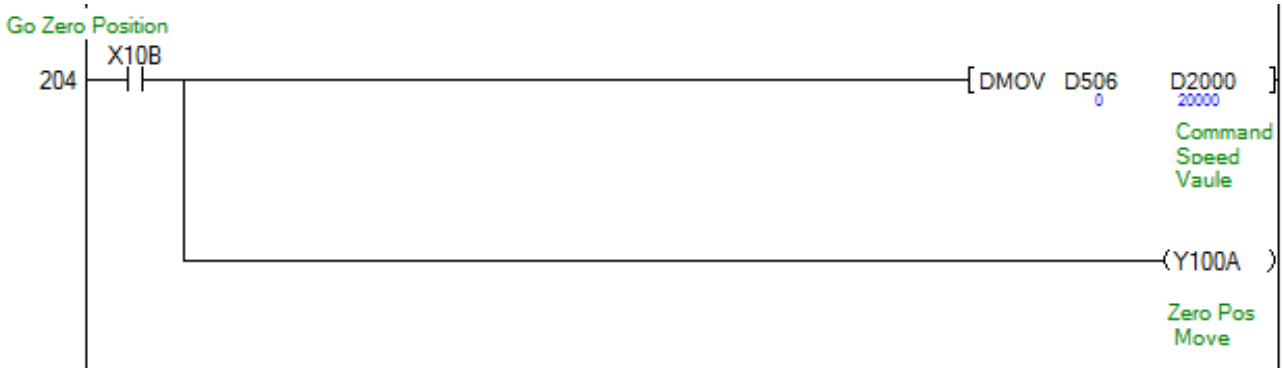
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
STEP +	Output	Y1004	JOGP	22	0x16
STEP -	Output	X1005	JOGN	23	0x17
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Speed	Output	D2000	Pn#B105 Jog Speed		
Acc/Dec Time	Output	D2003	Pn#B107 Jog Acc Dec Time		

Used Parameter

Parameter No.		Parameter Name
GUI No.	Parameter Code	
8	B008	Motion Dir
11	B009	Limit Sensor Dir
28	B104	Speed Override
29	B105	Jog Speed
30	B106	Jog Start Speed
31	B107	Jog Acc Dec Time

Device Comment

- Zero Position Move command : X10B
- User Operation Speed : D506
- User Acc/Dec Time : D540



1) Power input to the drive: Not return to Zero position yet

At the point of power on of the drive, the zero point position of the drive is designated as the encoder's current position value (Actual Positon).

2) Return to home position: Home position return not executed after drive power

If you move the zero point at ② before the zero point return, it moves to the zero point position set in 1).

Homing parameter When the value of "Homing Position Set (Pn # B206h)" is changed ③, the information of zero position set in 1) is not changed.

3) After completion of home return: completion of mechanical origin

The zero point position is designated by the value of homing parameter "Homing Position Set (Pn # B206h)" from the point of ⑤ when zero point return command is executed at the point of ④ and homing is completed.

Homing position set (Pn # B206h) "is changed at the point of ⑥ after homing, the specified zero point position is not changed at the point of ⑤.

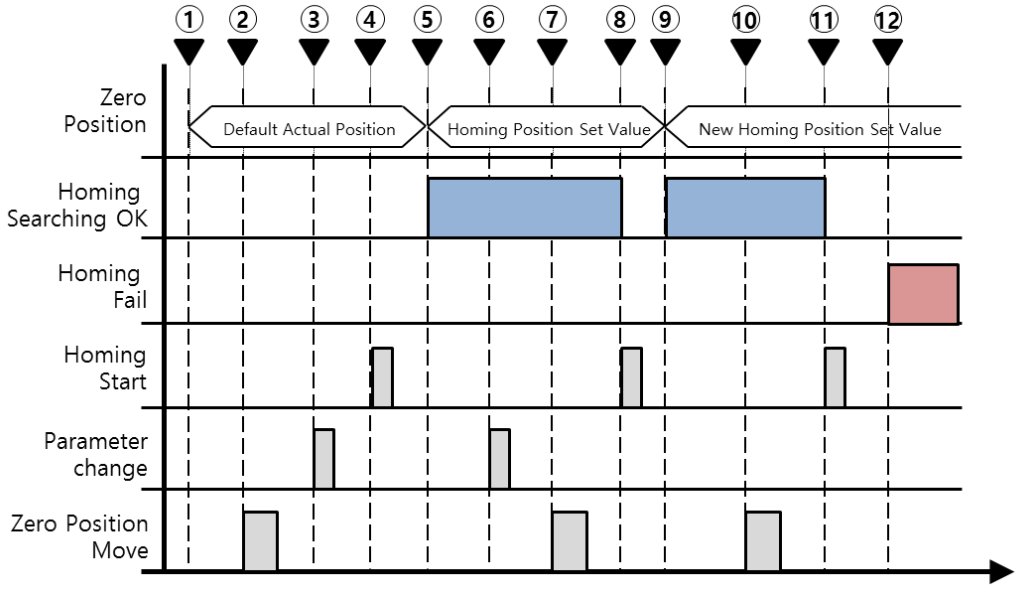
Homing parameter Even if homing is executed without changing the value of "Homing Position Set (Pn # B206h)", the current parameter value is designated as zero.

4) Completion of 2nd homing command: Zero position is designated, Homing is completed with changed homing profile

Homing position setting (Pn # B206h) "is changed to the zero point position when the home position return is executed again.

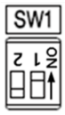
5) Homing command failure: Zero point position is specified and the executed homing command fails

In case ⑫ in which home return has failed, the zero position specified in 4) is not changed. If the origin return command does not complete homing, the specified value is retained at the time of drive boot.


1
2
3
4
5
6
7
8
9
10
11
12
Zero Position
Default Actual Position
Homing Position Set Value
New Homing Position Set Value
Homing Searching OK
Homing Fail
Homing Start
Parameter change
Zero Position Move

4.16 Position Move

Position move is the profile information determined at the time of command and moves to the target position. The profile information required at the time of command requires information on the target position, start speed, travel speed, acceleration time, and deceleration time. With this profile information, absolute positioning and relative positioning commands are performed.

⚠ **Attention**	The position move command is supported in 2 or more station occupied mode. SW1.1 must be turned ON to change to 2 station occupied mode. 

The position move command is a command to move to the target position even if the command is released at the time when the position movement is started. When the stop command is executed and the limit is reached during the position movement, the position movement is stopped.

1) Command execution: Normal command

The motion starts at ①, which is the point at which the position move command is executed and reaches the target position even if the command is released before reaching the target position ②.

2) Repeated command execution while moving: Ignore command

Move to the target position started in ③ even if the position move command is executed and the position move command is executed at the time when the position move is not completed as in ④.

3) Command maintenance: Move to normal position

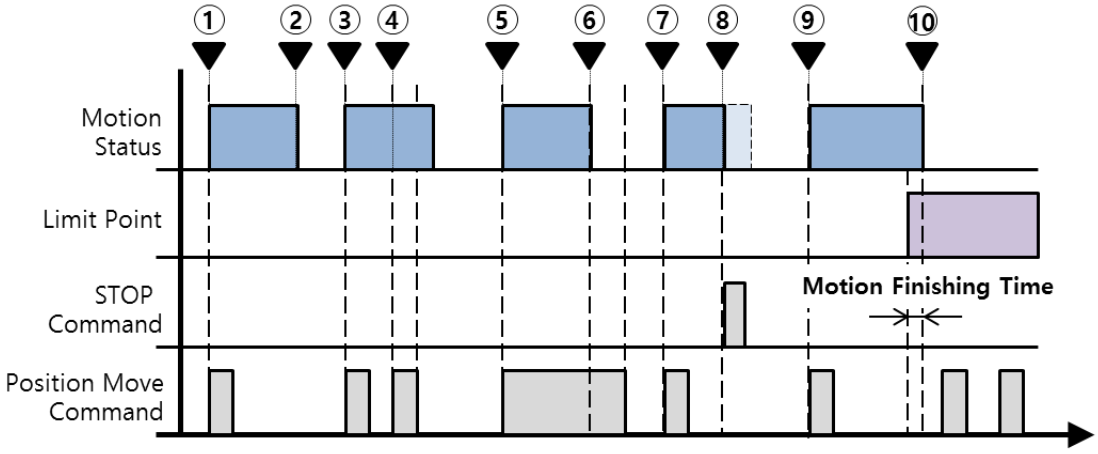
Even if the position move command is kept longer than the position ⑥ at which the position move command is completed, the target position executed at the point of ⑤ is maintained.

4) Stop command while moving: Command cancel

S-STOP or E-STOP is executed at ⑧ when the stop command is input. At this time, motion profile input from ⑦ point is canceled.

5) Limit reached during movement: Cannot move

When the motion at the point ⑨ at which the command is executed reaches the limit in progress, the motion stops at the point ⑩ because it stops according to the stopping method for the limit point.



4.16.1 Absolute Position Move

Absolute position movement is a command to move from the current position to the command position. The parameters used at this time are different from those used for jog operation.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
ABS Position Move	Output	Y1030	-	-	-
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Speed	Output	D2000	-		
Move Position	Output	D2004	-		
Acceleration time	Output	D2006	-		
Deceleration time	Output	D2007	-		

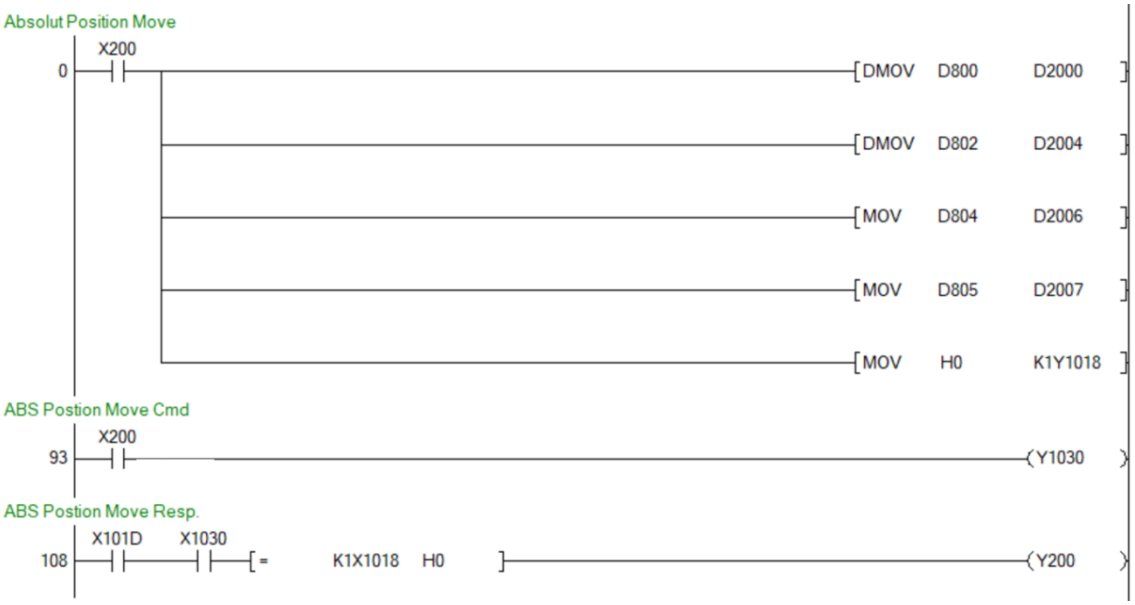
Main Parameter in Use

Parameter No.		Parameter Name
GUI No.	Parameter Code	
0	A011	E-STOP Method
2	B000	Pulse Per Resolution
3	B001	S/W +Limit Value

Parameter No.		Parameter Name
GUI No.	Parameter Code	
4	B002	S/W -Limit Value
5	B003	S/W Limit Stop Method
6	B004	H/W Limit Stop Method
8	B008	Motion Dir
24	B100	Axis Max Speed
25	B101	Axis Start Speed
26	B102	Axis Accel Time
27	B103	Axis Decel Time
28	B104	Speed Override

Device Comment

- Absolute position move command start : X200
- Absolute position move command response bit : Y200
- Operation Speed : D800
- Target Position : D802
- Acceleration time : D804
- Deceleration Time : D805



4.16.2 Incremental Position Move

Incremental position movement is a command that moves the current position by the command position. The parameters used at this time are parameters that are different from those used for jog operation.

Mapping Information

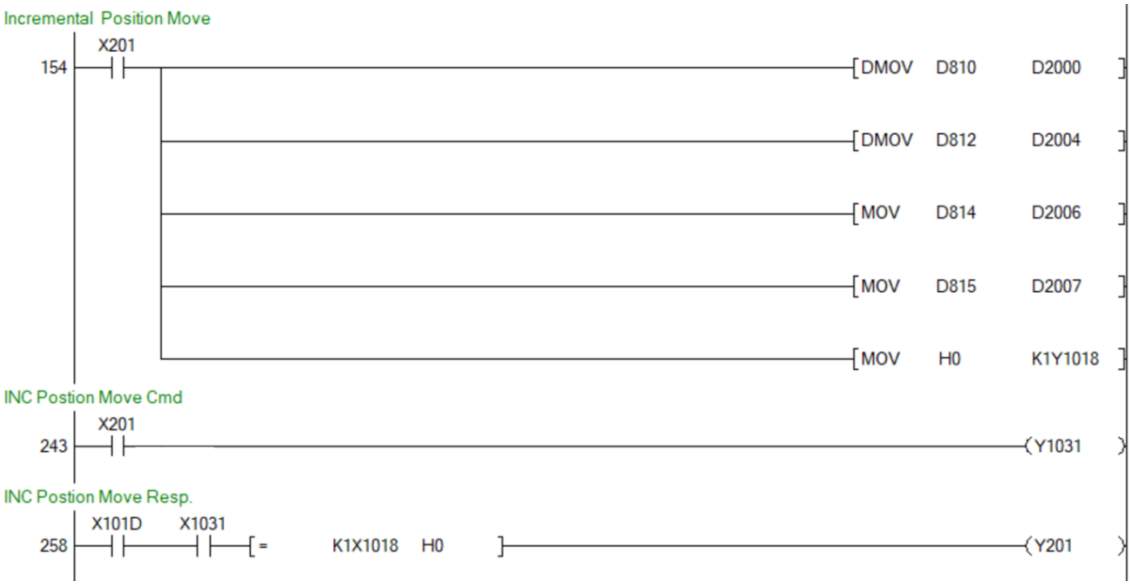
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Inc Position Move	Output	Y1031	-	-	-
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Speed	Output	D2000	-		
Move Position	Output	D2004	-		
Acceleration time	Output	D2006	-		
Deceleration time	Output	D2007	-		

Main Parameter in Use

Parameter No.		Parameter Name
GUI No.	Parameter Code	
0	A011	E-STOP Method
2	B000	Pulse Per Resolution
3	B001	S/W +Limit Value
4	B002	S/W -Limit Value
5	B003	S/W Limit Stop Method
6	B004	H/W Limit Stop Method
8	B008	Motion Dir
24	B100	Axis Max Speed
25	B101	Axis Start Speed
26	B102	Axis Accel Time
27	B103	Axis Decel Time
28	B104	Speed Override

Device Comment

- Incremental position move command : X201
- Incremental position move command response bit : Y201
- Operation Speed : D810
- Target Position : D812
- Acceleration Time: D814
- Deceleration Time : D815



4.16.3 Override Command

There is "Position Override" to change the target position when moving the position, and "Velocity Override" command to change the current running speed.

The override function of the position move command continues the motion by changing only the position information, which is the change condition, or the speed information in the motion profile in which the motion starts. For the motion characteristics of this, refer to "7.3 Motion profile of position movement".

Mapping Information

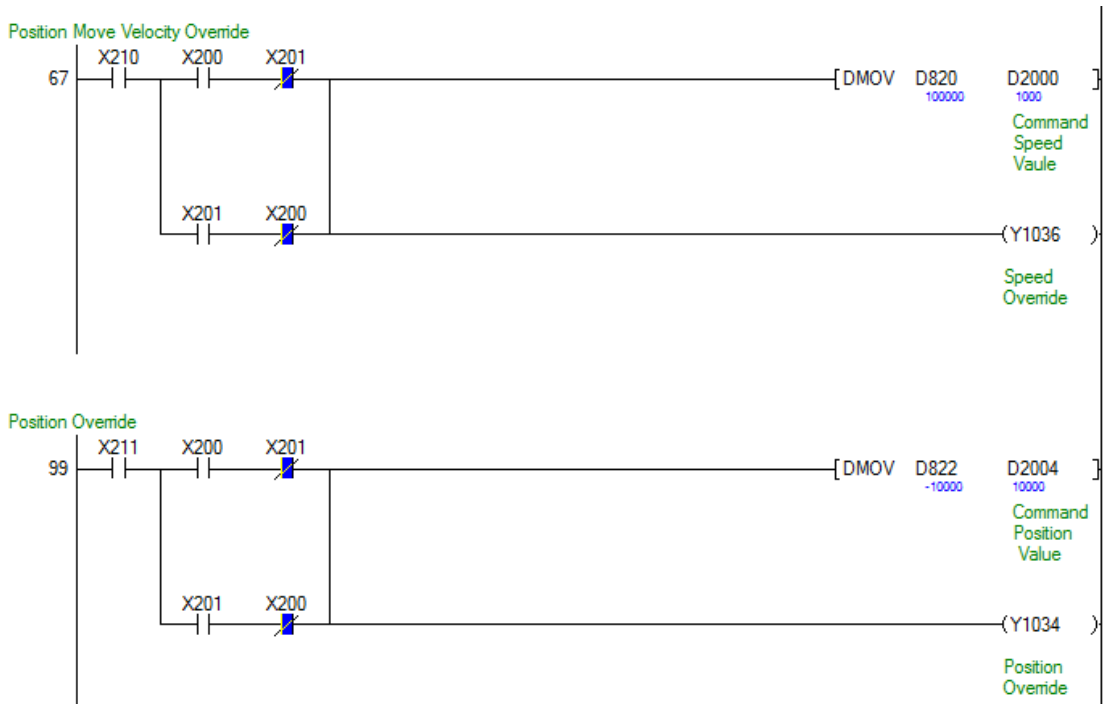
Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Abs Position Move	Output	Y1030	-	-	-
Inc Position Move	Output	Y1031	-	-	-
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Speed	Output	D2000	-		
Move Position	Output	D2004	-		

Main Parameter in Use

Parameter No.		Parameter Name
GUI No.	Parameter Code	
0	A011	E-STOP Method
2	B000	Pulse Per Resolution
3	B001	S/W +Limit Value
4	B002	S/W -Limit Value
5	B003	S/W Limit Stop Method
6	B004	H/W Limit Stop Method
8	B008	Motion Dir
24	B100	Axis Max Speed
25	B101	Axis Start Speed
26	B102	Axis Accel Time
27	B103	Axis Decel Time
28	B104	Speed Override

Device Comment

- Absolute position move command : X200
- Incremental position move command : X201
- Command to apply speed to change : X210
- Command to apply position to change : X211
- Operation speed to change : D820
- Target position to change : D822



Attention	Position override operation after speed override is disabled. Speed override operation after position override is disabled. In position movement in fixed time mode, speed and position override cannot be used.

4.16.4 Fixed Time Move Mode

Fixed time mode is a command that when executing position move command, the user does not designate speed and executes by designating the time reaches to target position.

This command is an additional function of absolute position move command and relative position move command, so it is applied in the same way as parameter of position move command.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Abs Position Move	Output	Y1030	-	-	-
Inc Position Move	Output	Y1031	-	-	-
Fixed Time Mode	Output	Y1032	-	-	-
Command Set **(2***	Output	Y100E	-	-	-
Command Code	Output	Y1018	-		
MOTION READY	Input	X1004	Motion Ready	20	0x14
Abs Position Move Resp.	Input	X1030	-	-	-
Inc Position Move Resp.	Input	X1031	-	-	-
Fixed Time mode Resp.	Input	X1032	-	-	-
Fixed Time Mode Warning Speed **(2***	Input	X1033	-	-	-
Fixed Time Mode Error. ultra-low speed Region **(3***	Input	X1034	-	-	-
Command Set Resp.	Input	X100D	-	-	-
Command Code	Input	X1018	-		
Move Speed **(1***	Output	D2000	-		
Move Position	Output	D2004	-		
Acceleration Time	Output	D2006	-		
Deceleration Time	Output	D2007	-		

*1) In fixed time mode, the arrival time value is entered and used in $\frac{1}{1000}$ seconds (1 [msec]). If you want to reach the target position in 2 seconds, enter '2,000' to execute the command.

*2) The moving speed is calculated inside the drive by the input target moving distance and time value. If the calculated speed is calculated with a value greater than the Max Speed set as a parameter, this bit is On and warning is displayed. However, if Command Set bit is On in this state, it ignores warning and moves to the set Max Speed.

*3) If the moving speed is less than 1 [pps] according to the input target position and time value, an error is displayed. If this bit is On, command is not executed even if Command Set bit is On.

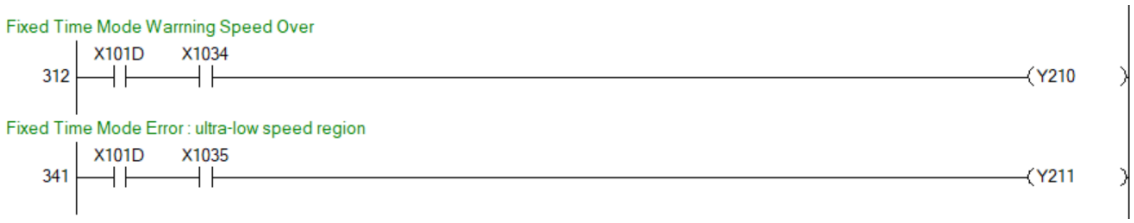
◆ Command Error Flag

The motor motion condition requires profile speed, target position, acceleration time and deceleration time. Unlike normal motion, time move command inputs motion move time instead of profile speed to reach the target position.

Ezi-STEPII CC-Link receives time value and calculates and applies the speed profile required for motion. Therefore, an error flag exists when the operation is performed at a physically impossible rate.

Example 1> – RX34 (F.T Mode Warning Speed): When the moving distance is 100,000 [pulse] and the speed to arrive is 0.1 [sec], the motor rotation speed should be 1,000,000 [pps]. In addition, if there is acceleration time and deceleration time, more rotation speed is required.

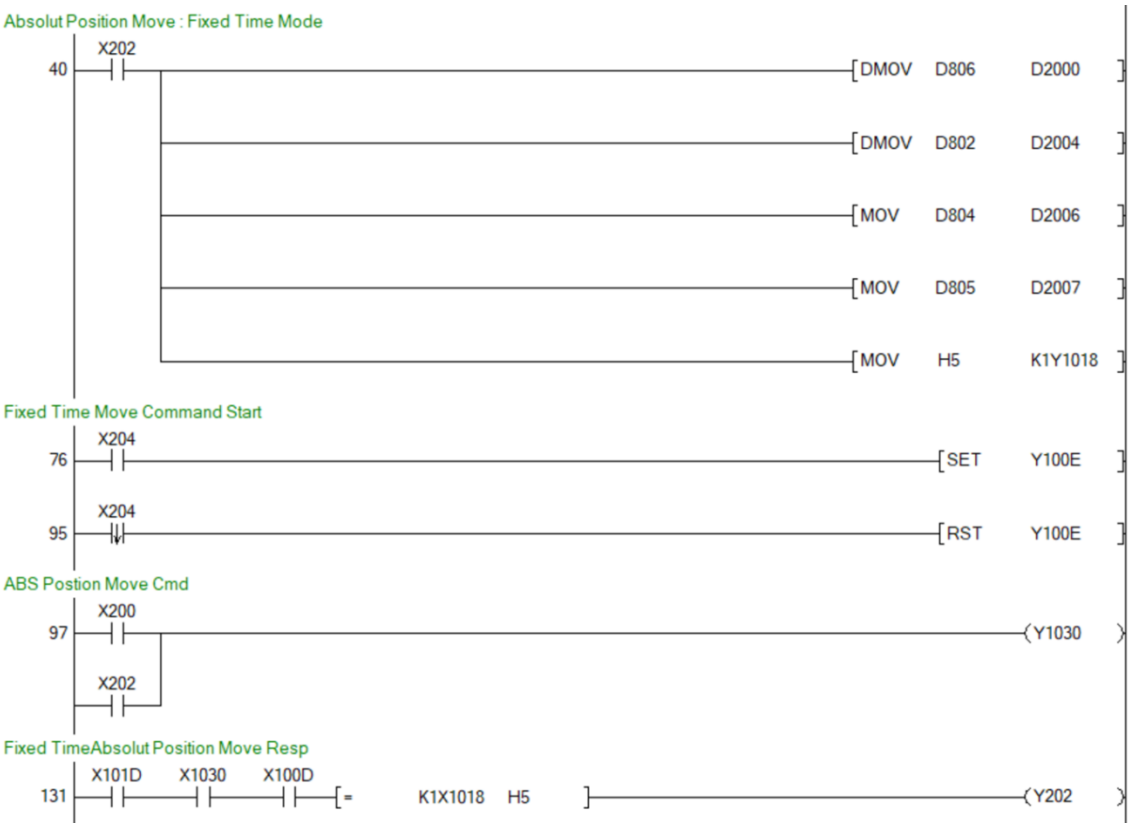
Example 2> – RX35 (Error Ultra-low Speed Region): When the moving distance is 5 [pulse] and the speed to arrive is 10 [sec], the motion speed of 0.5 [pps] is required. However, since the unit of pulse is an integer, the value of '0.5' cannot be used.



◆ Fixed Time ABS Position Move

Device Coment

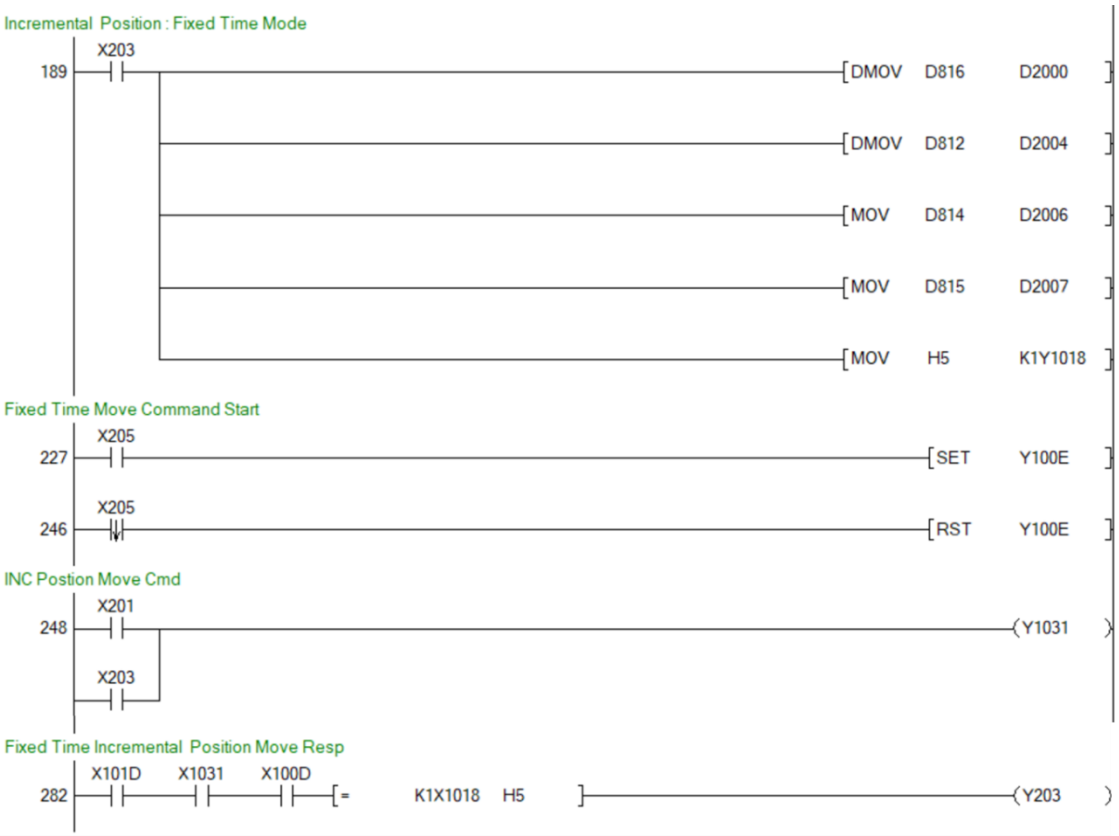
- Absolute position move ready command to fixed time : X202
- Move command response bit : Y202
- Target reach time : D806
- Target position : D802
- Accel Time : D804, Decel Time : D805



◆ Fixed Time INC Position Move

Device Comment

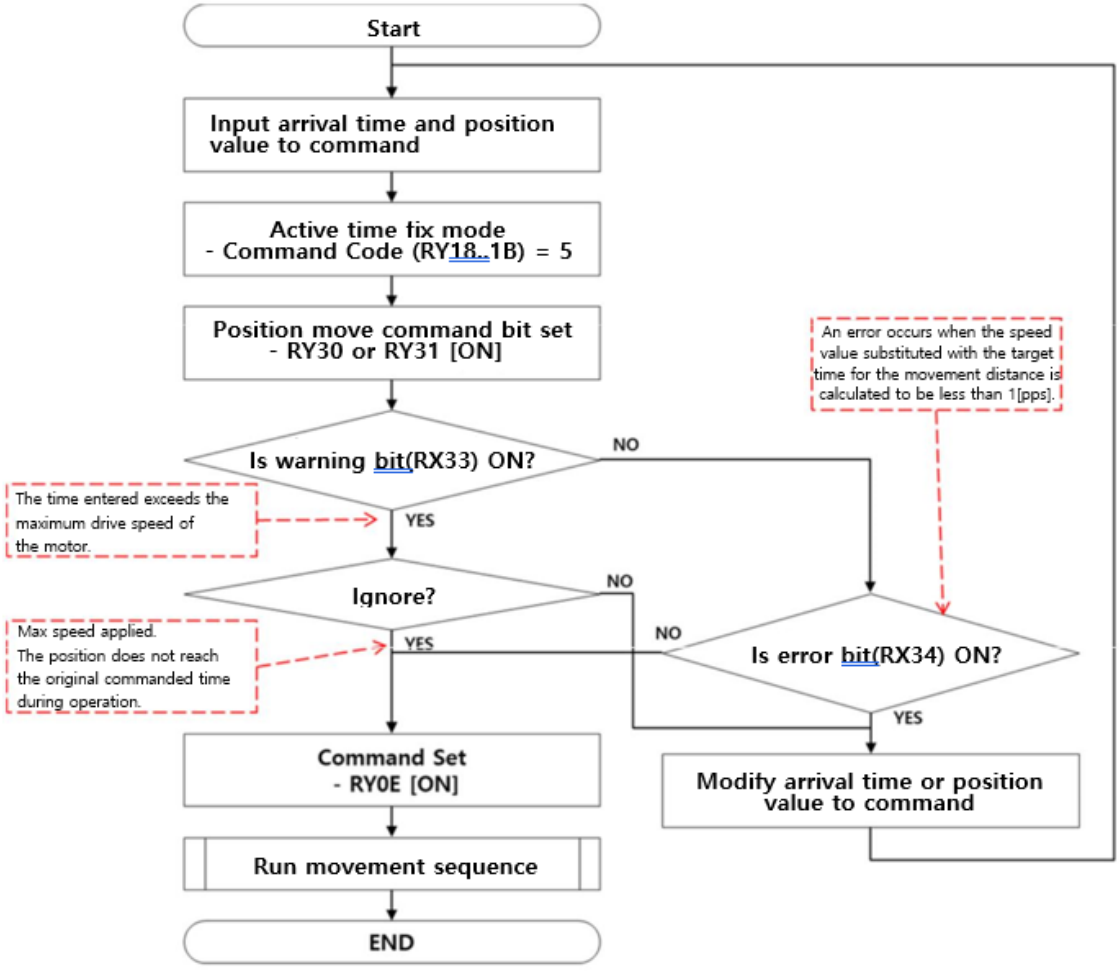
- Incremental position move ready command to fixed time : X203
- Move command response bit : Y203
- Target reach time : D830
- Target position : D812
- Accel Time : D814, Decel Time : D815



Device Comment

- Incremental position move ready command to fixed time : X231
- Absolute position move ready command to fixed time : X230
- Position move approval command to fixed time : X232

Movement Diagram



4.17 PT Operation

Potion Table (Position Table : PT below) operation is the operation in which the defined commands and the motion profiles of the commands are organized into tables and the commands are executed by calling them.

PT Command No.	PT Command Name	Function Description	Detailed Description of Motion Profile
0	Abs Move low speed.	The value of the position term is the absolute position value. - Teaching function available. - Continuous operation function available.	7.3.1 Motion of Position Move Command
1	Abs Move high speed.		
2	Abs Move high speed with deceleration.		
3	Abs Move with acceleration and deceleration.		
4	Inc Move low speed.	If the value of the position term is the incremental position value - Teaching function is disabled. - Continuous operation function available.	7.3.1 Movement of Position Move Command
5	Inc Move high speed		
6	Inc Move high speed with deceleration.		
7	Inc Move with acceleration and deceleration.		
8	Move to Origin	Homing command is executed according to the currently set parameter value.	8. Homing Profile
9	Clear Position	Reset the 'command position' and 'actual position' values to '0' at the current position.	-
10	Stop	This command is used to stop the push motion operation.	7.1 Operation of Stop Command

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
PT Start	Output	Y100B	PT Start	40	0x28
MOTION READY	Input	X1004	Motion Ready	20	0x14
Move Speed	Output	D2000	-		
Move Position	Output	D2004	-		

Used main Parameter

The parameter list can be checked in **"5.6 Position Table Parameter"**.

Device Comment

- Position Table operation start: X10C
- Select Single mode : X10D
- Position Table No. : D508

4.17.1 Normal PT Operation

After the normal PT operation completes the operation for the selected PT number, the jump table number (Item No. 88H) "is the command to be executed subsequently. If the jump table number is set to '-1', PT operation will be finished after PT operation is completed.

1) Command execution: Normal command

PT No. 13 selected in ①, which is the time when general PT operation command is executed, is executed. Since the jump PT number is specified as PT14 in PT13 started in ①, when PT13 is completed, PT14 is executed. Then, it continues to operate with the jump PT number of PT14.

2) Execute PT command during operation: Ignore command

If PT13 is run command while PT14 is running at the point of ② during PT operation, the PT command started from ① point is continuously executed.

3) Command maintenance: Normal execution

The PT operation command is a rising edge operation. Even if the PT operation command is maintained until the PT operation is terminated, the PT operation command executed is not repeated.

4) Change PT number: Ignore command

Even if the PT number is changed to 15 at the time of ③ of PT operation, it does not jump to PT15 and it is executed by PT27 which is the jump PT number of PT15.

5) Stop command during PT operation: Cancel command

S-STOP or E-STOP is executed at ④ when the stop command is input during operation. At this time, PT operation started from ① is stopped, PT operation of PT27 is canceled and PT operation is ended.

6) Do not jump PT to the table: 1 time table operation

If the jump table number is -1 (0xFF) in PT27 which is jumped after execution of PT 15, PT operation is terminated at ⑦, which is the time of normal operation of PT 27.

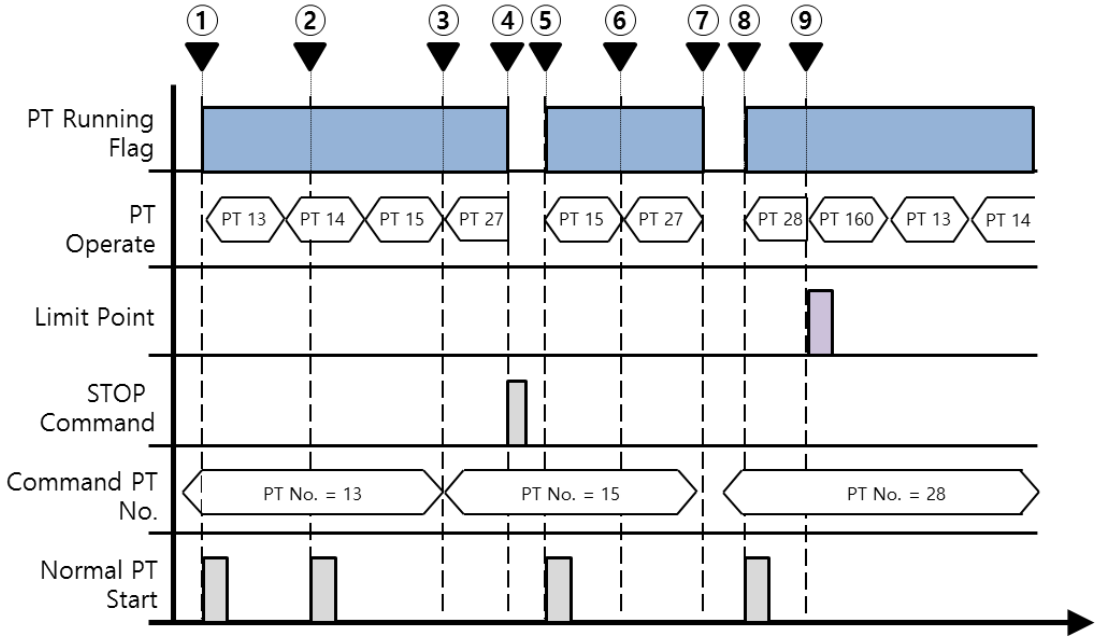
7) Limit point reached during PT operation: Not movable

In case of reaching the limit point during PT operation, the corresponding PT28 which is in operation at ⑧ point is canceled and PT160 which is the jump number of PT28 is executed.

8) Command of PT item is Homing command: Homing command operation

If the limit at point ⑨ is S / W Limit, the condition of S / W Limit is ignored.

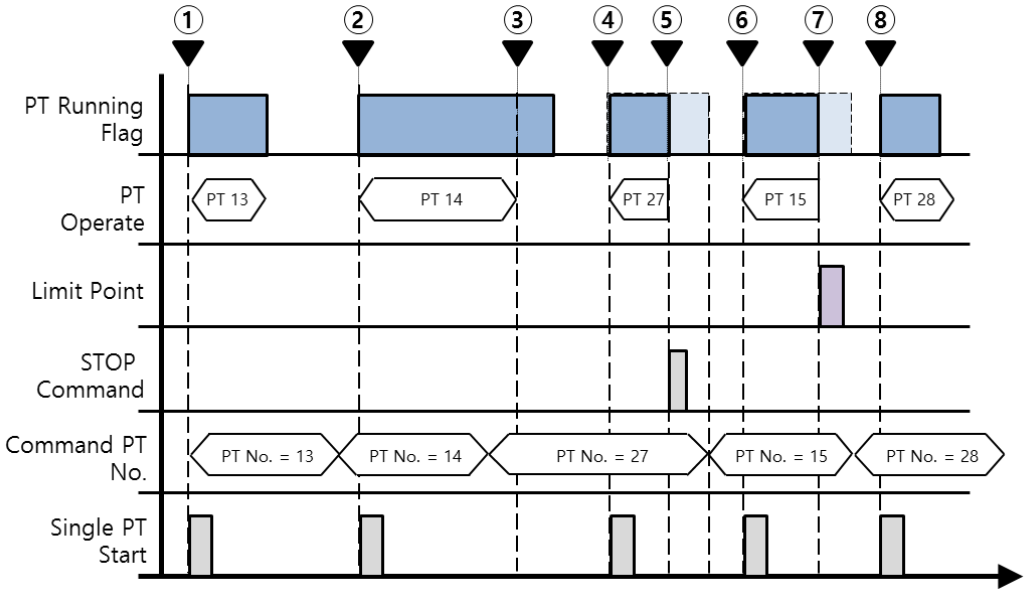
If the limit at point ⑨ is H / W Limit, it corresponds to Limit signal during homing.



PT No.	···	Jump Table No.	···
···	···	···	···
13	···	14	···
14	···	15	···
15	···	27	···
···		···	
27	···	-1	···
28	···	160	···
···		···	
160	···	13	···

4.17.2 Single PT Operation

Single PT operation is a command to execute the selected PT number alone. Even if there is a table jump item in the selected PT number, if the selected PT operation is completed, the PT operation state is ended.



PT No.	···	Jump Table No.	···
···	···	···	···
13	···	14	···
14	···	15	···
15	···	27	···
···		···	
27	···	-1	···
28	···	160	···
···		···	
160	···	13	···

1) Command execution: Normal command

PT No. 13 selected in ①, which is the point at which the single PT run command is executed, is executed. Even if the jump PT number is designated as PT14 in PT13 started from ①, PT operation is ended.

2) Execute PT command during operation: Ignore command

Even if a new command is input during single PT operation, the single PT operation command is executed normally.

3) Command maintenance: Normal execution

The PT operation command is a rising edge operation. Even if the PT operation command is maintained until the PT operation is terminated, the PT operation command executed is not repeated.

4) Change PT number: Ignore command

Even if the PT number is changed to 27 in the ③ of the single PT operation, the PT does not jump to the PT27, and the PT operation is finished when the PT14 in operation is completed.

5) Stop command during PT operation: Cancel command

If S-STOP or E-STOP is executed at ⑤ when the stop command is input during operation, single PT operation started from ④ is stopped and PT operation is terminated.

6) Limit point reached during PT operation: Not movable

In case of reaching the limit point during single PT operation, corresponding PT28 in operation is canceled and PT operation is terminated. At this time, operation is possible only when the PT operation command entered at ⑧ point is in the opposite direction of the limit point.

7) Command of PT item is Homing command: Homing command operation

If the limit at point ⑦ is S / W limit, the condition of S / W limit is ignored.

If the limit at point ⑦ is H / W Limit, it corresponds to limit signal during homing.

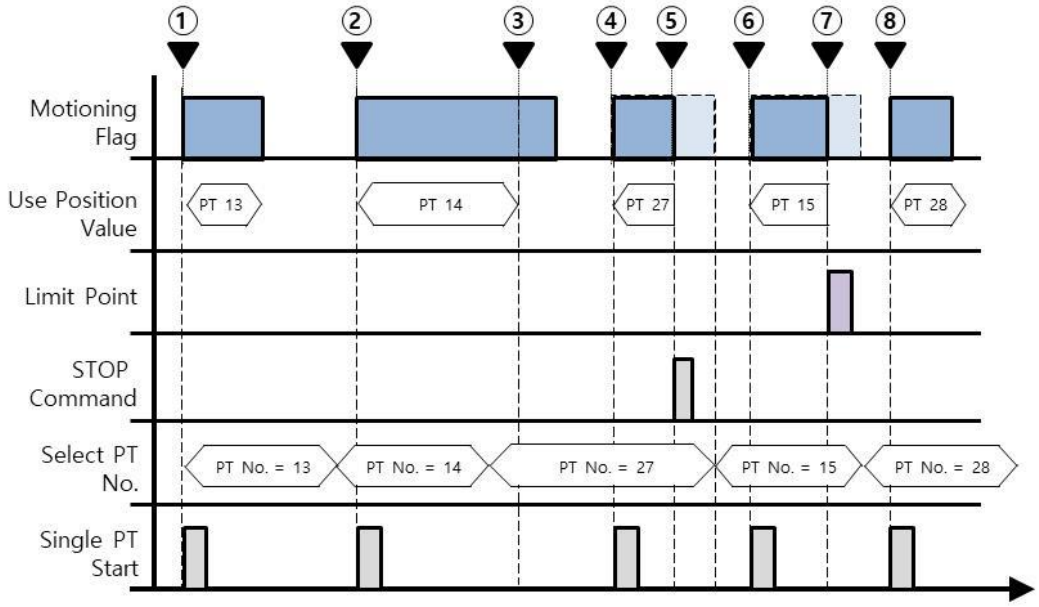
4.17.3 PT Point Move

PT point move is a command to move to user's input speed to the position saved in PT. However, the command is executed only when the command stored in the "PT Command (Pn # 80nn)" item of the selected PT number is recorded by moving the position.

The items to which the move command is applied are as follows.

[Pn#80nn] PT Command No.	PT Command Name
0	Abs Move low speed.
1	Abs Move high speed.
2	Abs Move high speed with deceleration.
3	Abs Move with acceleration and deceleration.
4	Inc Move low speed.
5	Inc Move high speed
6	Inc Move high speed with deceleration.
7	Inc Move with acceleration and deceleration.

It is executed by absolute position command or incremental position command depending on the type of PT. Basic operation is same as single PT operation, but operates by applying moving speed or arrival time information input in [RWw0..1] and acceleration / deceleration time input in [RWw3]. At this time, if the acceleration / deceleration time value input to RWw3 is '0', it operates by applying "acceleration time (Pn # 85nn)" and "deceleration time (Pn # 86nn)" stored in PT.



4.18 Controller Status Information

Status information of Ezi-STEP2 CC-Link can be checked by real-time data monitoring and status bit through remote receiving device.

4.18.1 Command Response Checking

The command response is a status flag that, when the host controller issues a command to the remote station, confirms that it has processed and completed the command.

Command response in 1 station occupied mode

Remote Input [RX]	Flag Name	Description
RX05	Jog Response	Turns ON when a jog command is executed.
RX06	Step Move Response	Turns ON when step move command is executed.
RX07	RUN/STOP	Turns ON when Motor is running.
RX08	MOTIONING	It turns ON when it is in the following operation state. - Control to drive the motor to the destination position - A state that receives a homing command and processes it - Position table operation is running
RX0A	Go Zero Position Resp.	It turns On when the zero point move command is executed.
RX0B	PT Running	When the position table operation is being executed, it turns On.
RX0C	Single PT Select Resp.	User tries to run position table operation in stand-alone mode.
RX0D	Command Set Resp.	It turns ON when an additional instruction is executed.
RX0F	Motion / Setting Resp.	This command indicates whether the status of the current I/ O Map is motion command processing status or setting mode.
RX10 ~ RX13	Step Move Position Resp.	The magnification value of the commanded step travel distance is displayed as 4-bit data.
RX14 ~ RX17	Monitor/Data Code Resp.	The value of the monitor code and data code that is commanded is displayed as 4-bit data.
RX18 ~ RX1B	Command Code Resp.	The value of the command code that is commanded is displayed as 4-bit data.

Command response in 2 station occupied mode

Remote Input [RX]	Flag Name	Description
RX30	ABS Position Move Resp.	Turns ON when the absolute position command is executed.
RX31	INC Position Move Resp.	Turns ON when incremental position move command is executed.
RX32	Fixed Time Mode Resp.	Turns ON when Fixed Time position move command is executed.
RX38 ~ RX3B	Monitor Code (2) Resp.	The value of the monitor code and data code that is commanded is displayed as 4-bit data.
RX3C ~ RX3F	Monitor Code (3) Resp.	The value of the monitor code and data code that is commanded is displayed as 4-bit data.

4.18.2 Axis Status Checking

A flag that checking the current operation status of the drive, It can check the availability of commands for the following actions.

Axis status flag in 1 station occupied mode

Remote Input [RX]	Flag Name	Description
RX00	MOTOR Enabled	The motor is in Servo On state and can be driven.
RX01	Emergency Stopped	Emergency stop command is executed by remote device or external input.
RX02	ALARM Status	An alarm has occurred in the drive.
RX03	Homing OK	Return to origin is completed normally by home return command.
RX04	MOTION READY	Motion command is available. When this bit is OFF, the motion command cannot be executed.
RX07	RUN/STOP	When it is within positioning completion range, it turns On.
RX08	MOTIONING	Turns on when the current motion is running
RX09	Hold status	The operation of the motor is paused.
RX0B	PT Running	Position table operation is running.
RX0E	Warning	The currently executed command is invalid, or the drive has failed.

Axis status flag in 2 station occupied mode

Remote Input [RX]	Flag Name	Description
RX33	Motion Accel	It turns ON when motion is accelerating.
RX34	Motion Decel	It turns ON when motion is decelerating.
RX36	S/W Limit +	It turns ON when the software limit of the plus is exceeded.
RX37	S/W Limit -	It turns ON when the software limit of minus is exceeded

4.19 Data Monitoring

The status information in the data format such as position information, speed, and parameter data is received and confirmed by the remote register.

Ezi-STEP2 CC-Link has 1 monitoring area in 1 station occupied mode and 2 monitoring areas in 2 station occupied mode, so user can simultaneously check 3 data simultaneously.

Monitoring Code

Code		Data Name	Description
[DEC]	[HEX]		
00	0x0	Real Command Position	Receives a value in [Pulse] units. This information does not apply to the reduction ratio parameter (Pn # B2022h, B2023h).
01	0x1	Real Actual Position	
02	0x2	Real Position Error	
03	0x3	Real Current Velocity	
04	0x4	Command Position	The value to be displayed changes according to the condition of the Parameter [Pn # B020h] Mechanism Type Select. This information is received with the reduction ratio parameter (Pn # B2022h, B2023h).
05	0x5	Actual Position	
06	0x6	Position Error	
07	0x7	Current Velocity	
08	0x8	-	-
09	0x9	-	-
10	0xA	-	-
11	0xB	Get I/O Pin Status	Check status of I / O pin of input & output
12	0xC	Get User I/O Status	Check status value of user setting I / O
13	0xD	-	-
14	0xE	Axis Status 1	Drive status information
15	0xF	Setting Mode	When the I / O Map is in Setting Mode, the command response code of monitoring code (1) is output as 1111 [b]

* When a monitoring code not defined above is used, the remote register input value becomes '0'.

Data monitoring of the drive responds with Remote Register (RWr) after entering the monitoring code to request Remote Output (RY). The quantity that can be monitored can be checked as one base when occupying 1 station, and the quantity that can be monitored increases by 2 whenever the station occupancy is increased.

The reliability of the data received in the Remote Register (RWr) can be classified by checking the Monitoring Code Resp. of the Remote Input (RX). This is confirmed as in the following example.

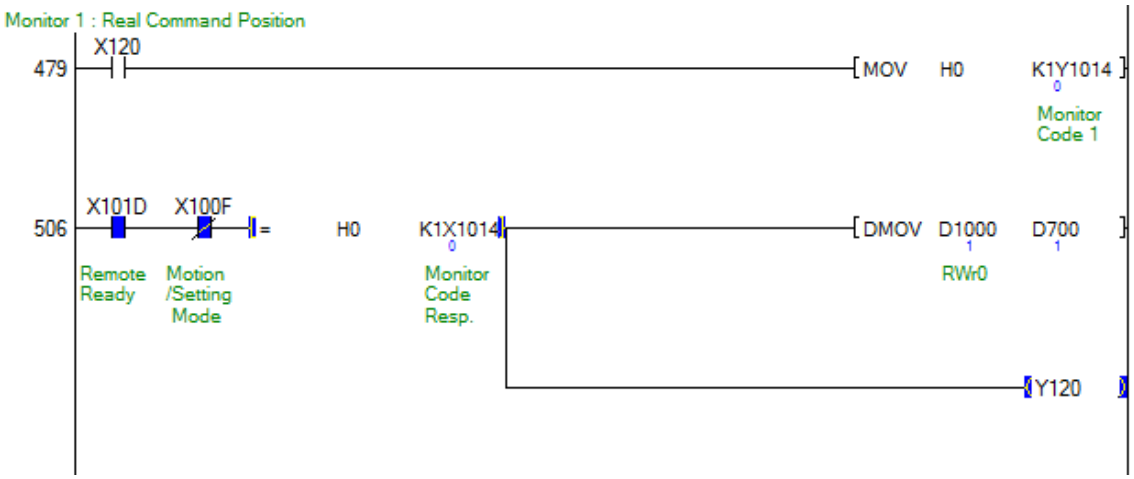
Remote receive register

Remote receive register [RWr]	Data Type	Description
RWr0	DWORD	In the motion control mode, data is received in response to the monitoring codes of the remote transmitting devices RX14 to RX13. In the setting control mode, the data value which is confirmed when reading and writing the parameter is received.
RWr4	DWORD	Regardless of the motion control mode and setting control mode, data is received in response to the monitoring codes of the remote transmitting devices RX38 to RX3B.
RWr6	DWORD	Regardless of the motion control mode and setting control mode, data is received in response to the monitoring codes of the remote transmitting devices RX3C to RX3F.

At this time, the received data is confirmed by DWORD type data, but in some conditions, upper WORD and lower WORD are used in combination.

Device comment

- Real Command Position Request : X120
- Peak / Current Load Request : X128
- Real Command Position Request notification : Y120



4.19.1 Position and Speed Information Check

In operating the system, checking the motion position and speed is essential. You can check the desired information by setting the parameter "Mechanism Type Select [Pn # B020h]" to convert the position and speed information checked in pulse units to control the motor into mechanical position and speed information.

Parameter Value [info]	System	Valid Parameter
0	Normal System	Pulse Per Resolution [Pn#B000h] Input Gear [Pn#B022h] Output Gear [Pn#B023h]
1	Ball Screw System (Lead Screw)	Pulse Per Resolution [Pn#B000h] Setting Unit : Unit [Pn#B021h] Drive axis gear information : Input Gear [Pn#B022h] Load axis gear information : Output Gear [Pn#B023h] Lead screw information : Screw Lead [Pn#B024h]
2	Belt & Pulley System (Conveyor System)	Pulse Per Resolution [Pn#B000h] Setting Unit : Unit [Pn#B021h] Drive axis gear information : Input Gear [Pn#B022h] Load axis gear information : Output Gear [Pn#B023h] Pulley information : Pulley Diameter [Pn#B025h]
3	Rotary Index Table	Pulse Per Resolution [Pn#B000h] Setting Unit : Unit [Pn#B021h] Drive axis gear information: Input Gear [Pn#B022h] Load axis gear information: Output Gear [Pn#B023h]

Equation1) Operation in Ball Screw (Lead Screw) Systems

$$Pulse = \frac{Pulse\ per\ Resolution}{Lead} \times Distance \times \frac{Input\ Gear}{Output\ Gear}$$

Equation2) Operation in belt pulley system (conveyor conveying system)

$$Pulse = \frac{Pulse\ per\ Resolution}{(Pulley\ diameter\ \times \pi)} \times Distance \times \frac{Input\ Gear}{Output\ Gear}$$

Equation3) Operation in Rotary Index Table

$$Pulse = \frac{Pulse\ per\ Resolution}{360^{\circ}} \times Distance \times \frac{Input\ Gear}{Output\ Gear}$$

4.19.2 External I/O Status Check

When data is requested as the previous status data checking method, external I / O status information can be obtained as follows.

Status value of I / O pin

DWORD		Data Name	Description
BIT	[HEX]		
0	0x00000001	Input Pin 1	Input state of pin 4 of CN1 connector terminal
1	0x00000002	Input Pin 2	Input state of pin 5 of CN1 connector terminal
2	0x00000004	Input Pin 3	Input state of pin 6 of CN1 connector terminal
3	0x00000008	Input Pin 4	Input state of pin 7 of CN1 connector terminal
4	0x00000010	Input Pin 5	Input state of pin 8 of CN1 connector terminal
5	0x00000020	Input Pin 6	Input state of pin 9 of CN1 connector terminal
6	0x00000040	Input Pin 7	Input state of pin 10 of CN1 connector terminal
7	0x00000080	-	
8	0x00000100	H/W + Limit	Detect H/W + Limit sensor
9	0x00000200	H/W - Limit	Detect H/W - Limit sensor
10	0x00000400	Origin Sensor	Home sensor is detected
11	0x00000800	Z-Pulse Sensor	Z phase sensor is detected
12	0x00001000	-	
13	0x00002000	-	
14	0x00004000	S/W + Limit	Current position exceeds S / W + Limit range
15	0x00008000	S/W - Limit	Current position exceeds S / W - Limit range
16	0x00010000	Output Pin 1	Output state of pin 11 of CN1 connector terminal
17	0x00020000	Output Pin 2	Output state of pin 12 of CN1 connector terminal
18	0x00040000	Output Pin 3	Output state of pin 13 of CN1 connector terminal
19	0x00080000	Output Pin 4	Output state of pin 14 of CN1 connector terminal
20	0x00100000	Output Pin 5	Output state of pin 15 of CN1 connector terminal
21	0x00200000	Output Pin 6	Output state of pin 16 of CN1 connector terminal
22	0x00400000	-	

* The information in the above table is confirmed by the remote receiving devices RX20 to RX2F in the 2 station occupied mode. Therefore, when requesting this information in the 2 station occupancy mode, you will be asked for information in duplicate.

Status information of user setting I / O

Code		Data Name	Description
BIT	[HEX]		
0	0x00000001	User Input 1 Map	The state of user input 1 assigned to the drive
1	0x00000002	User Input 2 Map	The state of user input 2 assigned to the drive
2	0x00000004	User Input 3 Map	The state of user input 3 assigned to the drive
3	0x00000008	User Input 4 Map	The state of user input 4 assigned to the drive
4	0x00000010	User Input 5 Map	The state of user input 5 assigned to the drive
5	0x00000020	User Input 6 Map	The state of user input 6 assigned to the drive
6	0x00000040	User Input 7 Map	The state of user input 7 assigned to the drive
-	-	-	-
16	0x00010000	User Output 1 Map	Status of user output 1 assigned to the drive
17	0x00020000	User Output 2 Map	Status of user output 2 assigned to the drive
18	0x00040000	User Output 3 Map	Status of user output 3 assigned to the drive
19	0x00080000	User Output 4 Map	Status of user output 4 assigned to the drive
20	0x00100000	User Output 5 Map	Status of user output 5 assigned to the drive
21	0x00200000	-	

* The above table is information for processing the external I / O signals of the drive in the host controller

4.19.3 Current Load [%]

The amount of load checked by monitoring is calculated from the amount of position change detected by the encoder position feed-back information used in the current closed-loop processing of the motor and the information detected when controlling the step angle of the stepping motor is. Therefore, the load is not measured in the Servo Off state in which current is not applied to the motor.

An overload alarm will occur if the load is held above 100 [%] for more than 5 seconds while the motor is stopped or driven

This information can be used for inspection of the equipment system, and the relative load can be evaluated by comparing the load at the time of initial installation and the load at the time of inspection. And because it is linked with the parameter "[Pn # B00Ch] Run Current", even if it is the same equipment system, if this parameter is changed, the load amount to be verified will be checked differently from the previous information

Attention	When an alarm occurs in the drive, the current amount of the motor and the load amount of the drive are kept at the state value just before the alarm is generated in order to track it.

4.19.4 Peak Load [%]

Peak load is the maximum load after drive power on. To clear this value, parameter request can be made by changing RY0F of I / O-Map to '1' and changing it to "Command Code = 8".

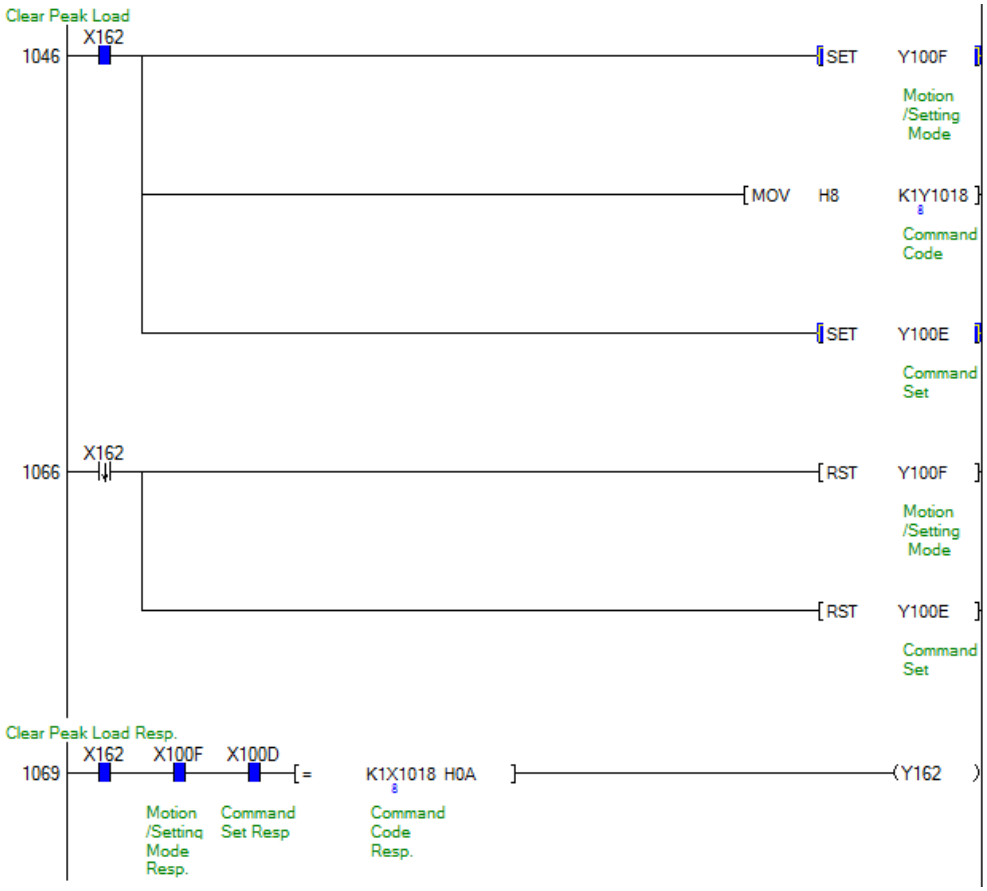
Mapping information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Command Set	Output	Y100E	-	-	-
Motion / Setting	Output	Y100F			
Command Code 0	Output	Y1018	-	-	-
Command Code 1	Output	Y1019	-	-	-
Command Code 2	Output	Y101A	-	-	-
Command Code 3	Output	Y101B	-	-	-
Command Set Resp.	Input	X100D	-	-	-
Motion / Setting Resp.	Input	X100F			

Command Code Resp. 0	Input	X1018			
Command Code Resp. 1	Input	X1019			
Command Code Resp. 2	Input	X101A			
Command Code Resp. 3	Input	X101B			

Device comment

- Parameter Request Command : X110
- Parameter Code : D510
- Normal execution flag of Parameter request command : Y110
- Requested Parameter: D600



Attention

If the processing of Y100F and Y100E is used as a coil, other setting command and redundant coil may not be executed. Therefore, Y100F and Y100E are treated as bit set instructions, and at step "1066" instructions are added to clear the falling differential of instruction execution.

4.19.5 Motor Current [mA]

The amount of current in the motor is the value indicating the effective value (RMS) of the motor's A and B phases. It cannot be displayed higher than the specifications of the applied motor.

4.19.6 Drive Status Information

Since Ezi-STEPII CC-Link occupies 1 station, the size of the cyclic buffer is small, so it is impossible to execute all requests for information immediately. You can check the status information of the drive by combining 32-bit data which is confirmed as monitoring data.

Drive Status Information

Code		Data Name	Description
BIT	[HEX]		
0	0x00000001	Error All	Alarm occurs on drive
1	0x00000002	H/W + Limit	Detect H/W + Limit sensor
2	0x00000004	H/W - Limit	Detect H/W – Limit sensor
3	0x00000008	S/W + Limit	Current position exceeds S / W + Limit range
4	0x00000010	S/W - Limit	Current position exceeds S / W - Limit range
5	0x00000020	Master Connection	When the master controller is detected
6	0x00000040	RS485 Approve	Control authority approved through RS485
7	0x00000080	Error Step Alarm	When the motor in the Step ON state is stopped, the 'Pos Error' value is set to "[Pn # B00A] Pos. Error Overflow Limit "is exceeded
8	0x00000100	Error Current	The current through power devices in inverter exceeds the limit value
9	0x00000200	Error Over Speed	Motor speed excess 3000[rpm]
10	0x00000400	Error Step Out	Motor does not follow the pulse input normally
11	0x00000800	Reserved	
12	0x00001000	Error Over Heat	An alarm whose drive internal temperature exceeds 85°C
13	0x00002000	Error Back EMF	Alarm with motor back EMF voltage exceeding 70V
14	0x00004000	Error Motor Power	Motor voltage error alarm
15	0x00008000	Error Low Power	Drive power error alarm
16	0x00010000	E-Stopped	When the emergency stop command is executed
17	0x00020000	S-Stopped	In the state where the normal stop command is executed and stopped during motion
18	0x00040000	Origin Returning	Origin return state
19	0x00080000	Run/Stop	When positioning, close to "[Pn # B006h] In-position Value" range
20	0x00100000	Step On	Motor is Step On state
21	0x00200000	Alarm Reset	Alarm release command is being executed
22	0x00400000	PT Stopped	Status of position table operation is terminated
23	0x00800000	Origin Sensor	When home sensor is detected
24	0x01000000	Z-Pulse Sensor	Z phase sensor is detected
25	0x02000000	Origin Return Ok	Origin return completed state
26	0x04000000	Motion Direction	Motor running direction (0: + direction, 1: - direction)
27	0x08000000	Motioning	Motion in progress
28	0x10000000	Motion Pause	Paused
29	0x20000000	Motion Accel.	The state of motion being accelerated in motion progress
30	0x40000000	Motion Decel.	The state of motion being decelerated in motion progress
31	0x80000000	Motion Const.	The state of motion being constant in motion progress

* The above table is the same data that can be obtained by FAS_GetAxisStatus command of Ezi-MOTION PlusR Protocol.

4.20 Parameter Access

As a parameter access method, there is a method to access each parameter coat by calling RS485 and remote device of host controller. The code number of the parameter can be checked in "5. Parameter List".

4.20.1 Parameter Request

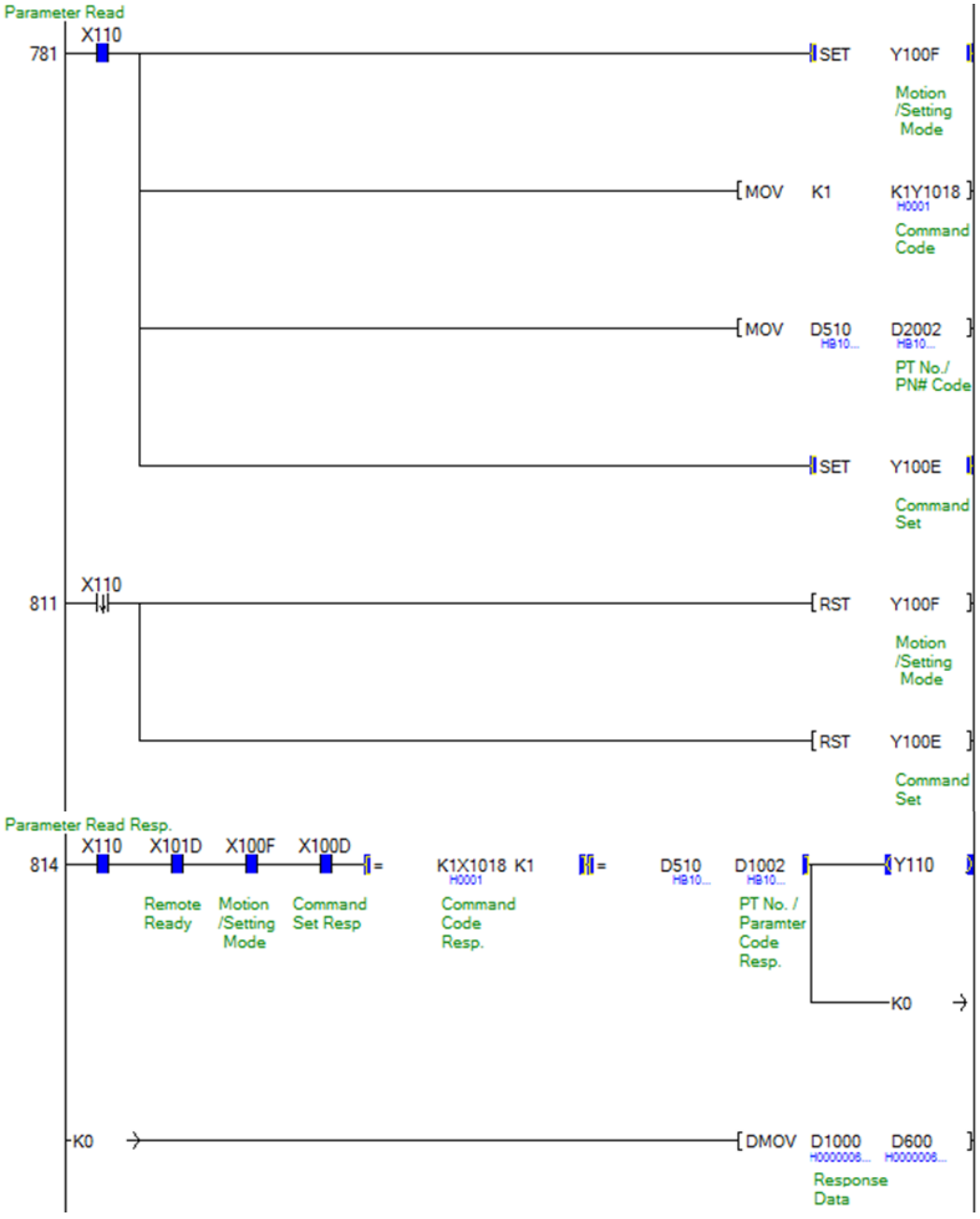
To check parameter data through the CC-Link host controller, set RY0F of I / O-Map to '1' and change it to "Command Code = 1" to request the parameter. The requested data is confirmed as DWORD data in the remote register receiving area RWr0 to RWr1.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Command Set	Output	Y100E	-	-	-
Motion / Setting	Output	Y100F			
Command Code 0	Output	Y1018	-	-	-
Command Code 1	Output	Y1019	-	-	-
Command Code 2	Output	Y101A	-	-	-
Command Code 3	Output	Y101B	-	-	-
Command Set Resp.	Input	X100D	-	-	-
Motion / Setting Resp.	Input	X100F			
Command Code Resp. 0	Input	X1018			
Command Code Resp. 1	Input	X1019			
Command Code Resp. 2	Input	X101A			
Command Code Resp. 3	Input	X101B			
Parameter Code	Output	D2002	-		
Parameter Code Resp.	Input	D1002	-		
Response Data	Input	D1000	-		

Device Comment

- Parameter Request Command : X110
- Parameter Code : D510
- Normal execution flag of Parameter request command : Y110
- Requested Parameter: D600



Attention

If the processing of Y100F and Y100E is used as a coil, other setting command and redundant coil may not be executed. Therefore, Y100F and Y100E are treated as bit set instructions, and at step "811" instructions are added to clear the falling differential of instruction execution.

4.20.2 Parameter Change

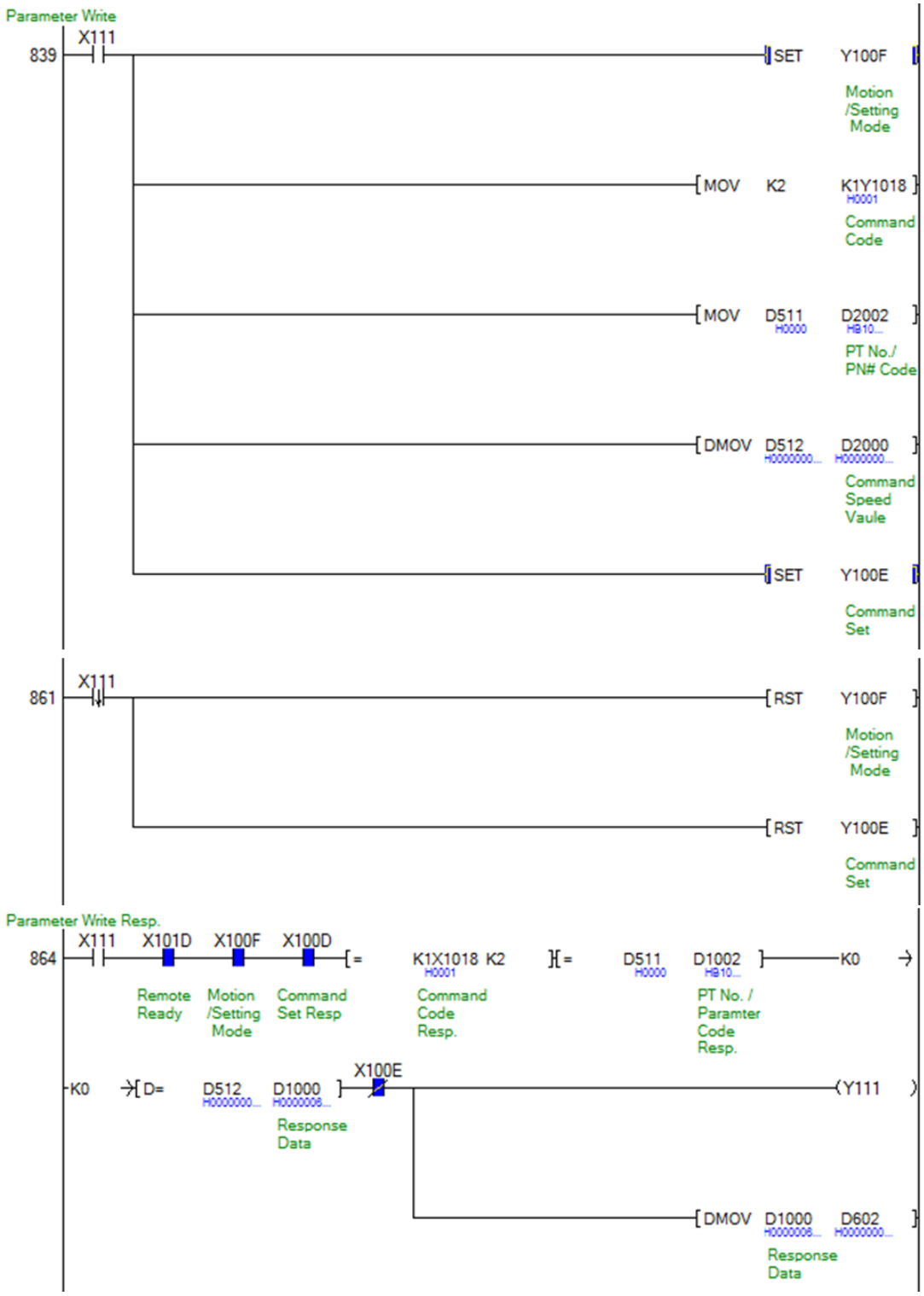
To modify the parameter data, set RY0F to '1' and change the setting mode Command Code = 2. When parameter change command is executed normally, it responds with changed parameter value.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Command Set	Output	Y100E	-	-	-
Motion / Setting	Output	Y100F			
Command Code 0	Output	Y1018	-	-	-
Command Code 1	Output	Y1019	-	-	-
Command Code 2	Output	Y101A	-	-	-
Command Code 3	Output	Y101B	-	-	-
Command Set Resp.	Input	X100D	-	-	-
Motion / Setting Resp.	Input	X100F			
Command Code Resp. 0	Input	X1018			
Command Code Resp. 1	Input	X1019			
Command Code Resp. 2	Input	X101A			
Command Code Resp. 3	Input	X101B			
Parameter Code	Output	D2002	-		
Parameter Data	Output	D2000			
Parameter Code Resp.	Input	D1002	-		
Response Data	Input	D1000	-		

Device Comment

- Parameter Request Command : X111
- Parameter Code Value : D511
- Parameter Value to change : D512
- Normal execution flag of Parameter request command : Y111
- Changed Parameter Value : D602



Attention	If the processing of Y100F and Y100E is used as a coil, other setting command and redundant coil may not be executed. Therefore, Y100F and Y100E are treated as bit set instructions, and step "861" has been added to clear the falling instruction differential of instruction execution.

4.20.3 Save Parameter

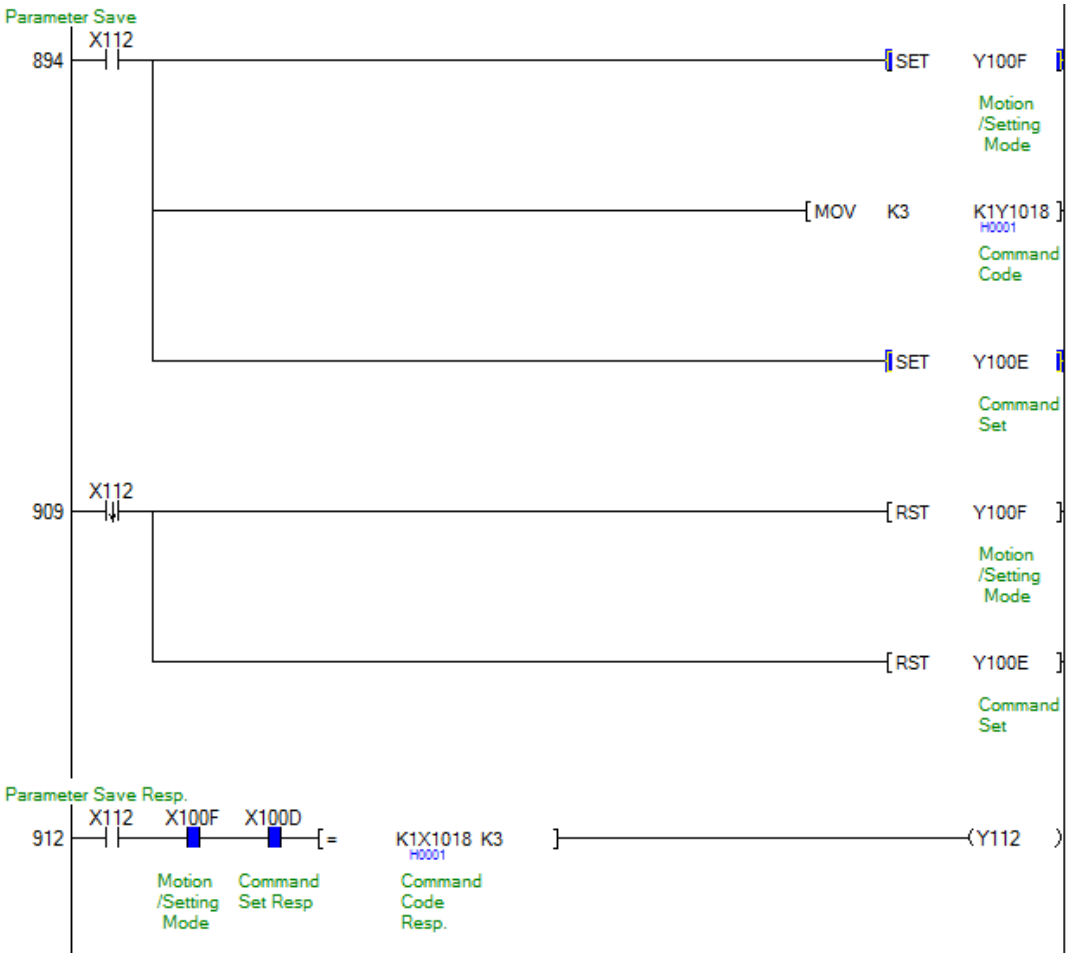
To save the data after changing the parameter data of the drive, you must execute the Save Parameter command. This can be commanded with "Command Code = 3" in setting mode by setting RY0F to '1'.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Command Set	Output	Y100E	-	-	-
Motion / Setting	Output	Y100F			
Command Code 0	Output	Y1018	-	-	-
Command Code 1	Output	Y1019	-	-	-
Command Code 2	Output	Y101A	-	-	-
Command Code 3	Output	Y101B	-	-	-
Command Set Resp.	Input	X100D	-	-	-
Motion / Setting Resp.	Input	X100F			
Command Code Resp. 0	Input	X1018			
Command Code Resp. 1	Input	X1019			
Command Code Resp. 2	Input	X101A			
Command Code Resp. 3	Input	X101B			

Device Comment

- Parameter request command : X112
- Parameter normal execution flag of request command : Y112

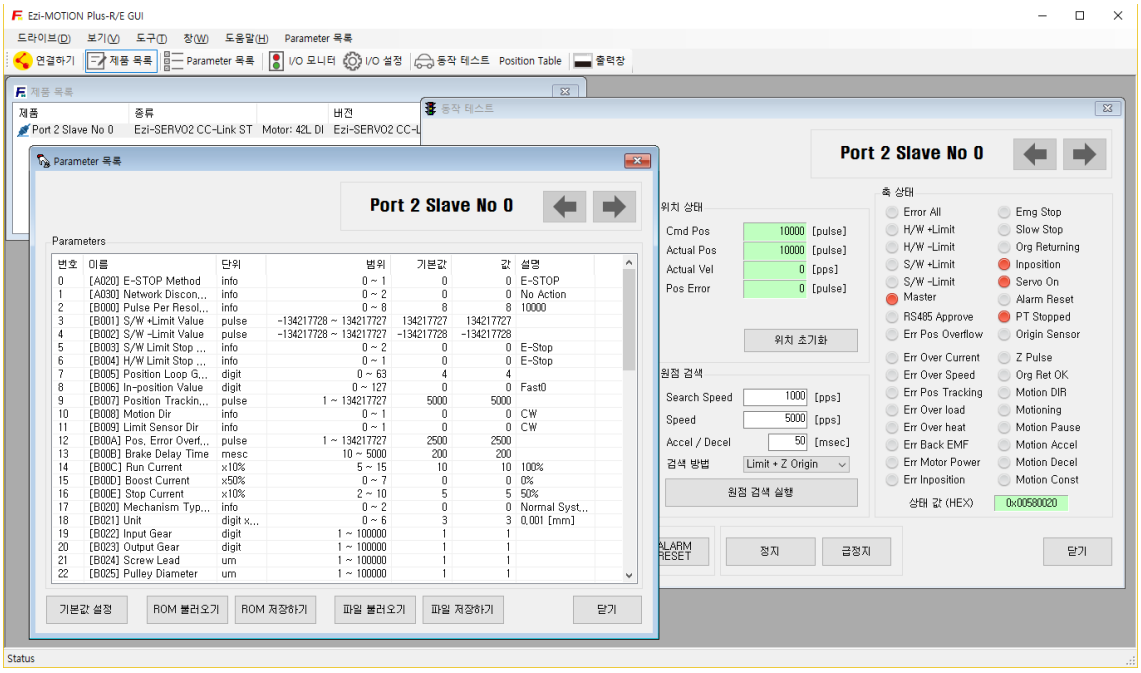


Attention	If the processing of Y100F and Y100E is used as a coil, other setting command and redundant coil may not be executed. Therefore, Y100F and Y100E are processed as bit set instructions, and instructions are added at step "909" to clear the falling differential of instruction execution.

4.20.4 Access to Ezi-MOTION Plus-R GUI Program

The window GUI program of Ezi-STEPII CC-Link can be downloaded from the FASTECH website (www.fastech.co.kr).

In the provided Windows GUI program, it is possible to check the data of the parameter easily, but the change and save command of data cannot be arbitrarily modified because of permission setting. When changing and saving the parameters, proceed to the CC-Link network forcible exit and execute the authority release command to the host controller.
<Refer to 4.8 RS485 control authority>



Attention	Ezi-STEPII CC-Link is compatible with Ezi-MOTION Plus-R GUI Ver.6.40.11.XX or higher.

4.21 Teaching Command

Teaching in the robot system is a task in which the user directly identifies the movement path and the target point. This has the advantage that it is easy for users to process commands and manage their locations

Ezi-STEPII CC-Link Motion profile information saved as teaching command is saved in Position Table. Therefore, you must complete the teaching and execute the parameter save command. The motion profiles stored here are as follows.

Items Saved by Teaching

Item	Data Access	Applied Data	Data Size
Motion Type	Constant	Normal Absolut Position Move	-
Acceleration time	Parameter	[Pn#B102] Axis Accel Time	WORD
Deceleration time	Parameter	[Pn#B103] Axis Decel Time	WORD
Start Speed	Parameter	[Pn#B101] Axis Start Speed	DWORD
Move Speed	User Input	RWw0	DWORD
Target Position	Status Information	Command Code = A : Command Position Command Code = B : Actual Position	DWORD
Jump PT No.	Constant	No Jump (-1)	-
Waiting Time	Constant	No Delay (0 [msec])	-

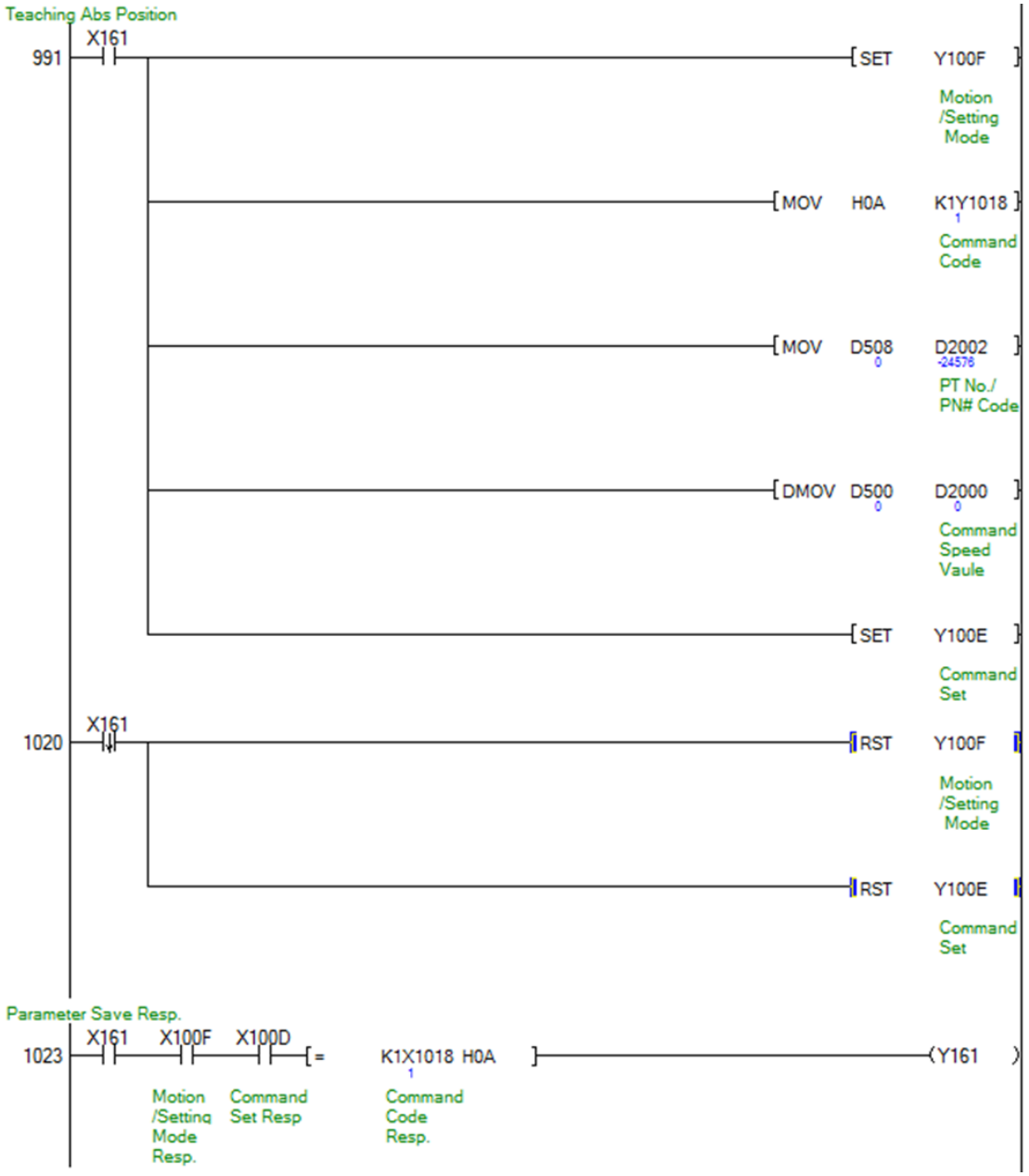
The teaching command is executed in the setting mode in which RY0F is set to '1'. If the command code is '0xA', the teaching is Absolute Position Teaching to teach the encoder position value. '0x0B' is used to teach the current position follower value Command Position as position information.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Command Set	Output	Y100E	-	-	-
Motion / Setting	Output	Y100F			
Command Code 0	Output	Y1018	-	-	-
Command Code 1	Output	Y1019	-	-	-
Command Code 2	Output	Y101A	-	-	-
Command Code 3	Output	Y101B	-	-	-
Command Set Resp.	Input	X100D	-	-	-
Motion / Setting Resp.	Input	X100F			
Command Code Resp. 0	Input	X1018			
Command Code Resp. 1	Input	X1019			
Command Code Resp. 2	Input	X101A			
Command Code Resp. 3	Input	X101B			
Parameter Code	Output	D2002	-		
Parameter Code Resp.	Input	D1002	-		
Response Data	Input	D1000	-		

Device Comment

- Execute Absolute Position Teaching : X151
- PT number to Teaching : D508
- Speed Value to Teaching: D500
- Teaching Complete Flag : Y111



* In the above example, Absolute Position Teaching is performed by inputting 4-bit Data "0xA" to the remote device output "Y1018". At this, if 4-bit 0xB is input to the remote device output "Y1018", Command Position Teaching is executed.

Attention	If the processing of Y100F and Y100E is used as a coil, other setting command and redundant coil may not be executed. Therefore, Y100F and Y100E have been processed by bit set instruction, and step "1020" has been added to clear the falling instruction differential of instruction execution.

4.22 Set Current Position

The current position command is a command that specifies the current motor position as the input value. When this command is executed, the current position tracking value (Command Position) and encoder position value (Actual Position) are changed to the value to be changed.

The current position command can be the same as the "Position Set" of the homing method, but the origin return command cannot be executed in Servo Off state, but the current position command can be executed. However, the origin is not reset even when the current positioning command is executed. In addition, the target position of the zero movement command becomes the designated position after returning to origin.

Reference

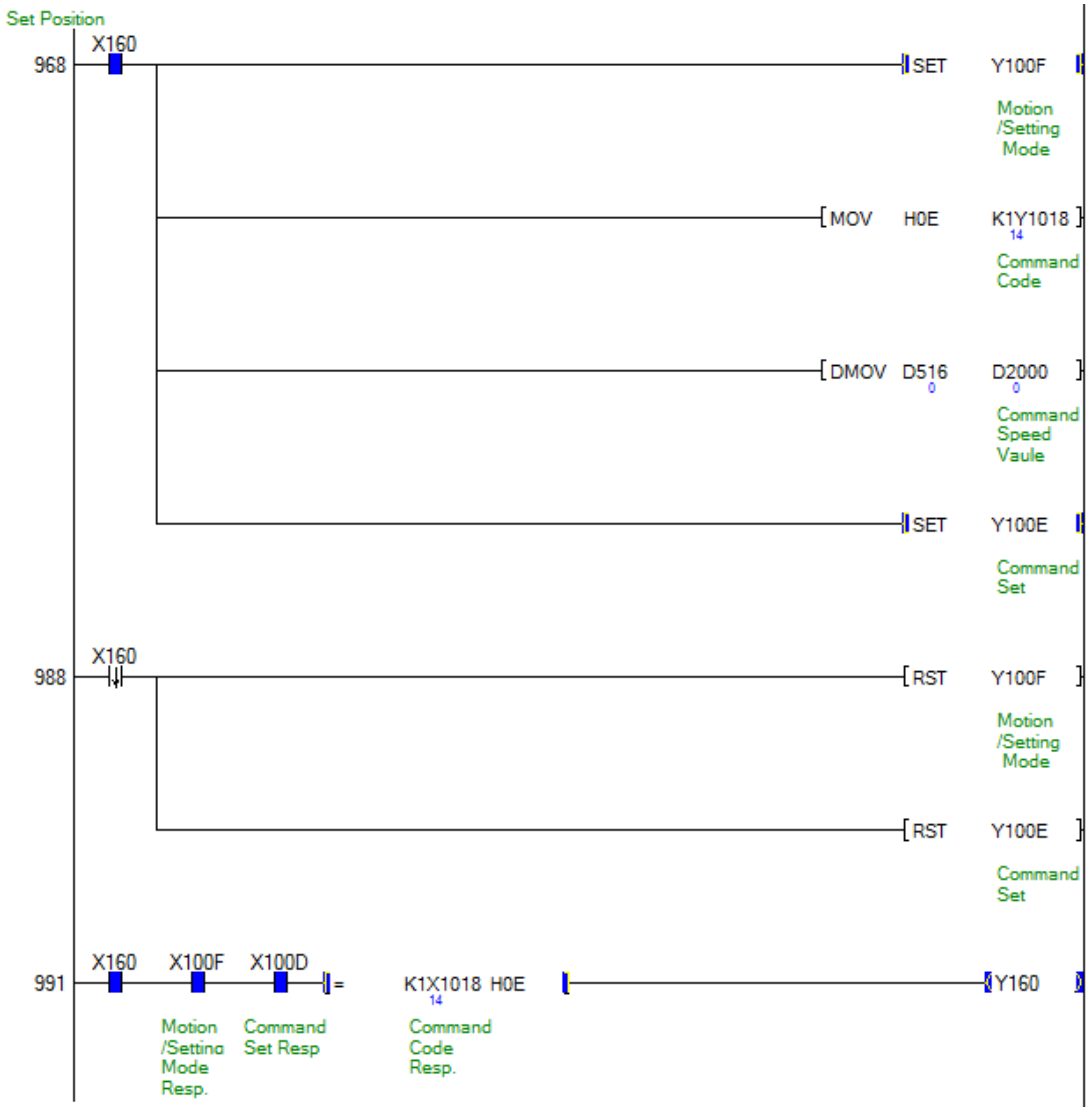
This function is mainly used in the conveyor system to initialize the position after the transfer is completed.

Mapping Information

Motion Name	Function PLC->Drive	Remote Device Mapping	Ext. I/O		
			Mapping Name	[DEC]	[HEX]
Command Set	Output	Y100E	-	-	-
Motion / Setting	Output	Y100F			
Command Code 0	Output	Y1018	-	-	-
Command Code 1	Output	Y1019	-	-	-
Command Code 2	Output	Y101A	-	-	-
Command Code 3	Output	Y101B	-	-	-
Command Set Resp.	Input	X100D	-	-	-
Motion / Setting Resp.	Input	X100F			
Command Code Resp. 0	Input	X1018			
Command Code Resp. 1	Input	X1019			
Command Code Resp. 2	Input	X101A			
Command Code Resp. 3	Input	X101B			

Device Comment

- Parameter request command : X110
- Parameter Code : D510
- Normal execution flag of Parameter request command: Y110
- Requested Parameter: D600



5. Parameter List

Parameter of Ezi-STEPII CC-Link can be changed by command to access CC-Link remote device and window-based Ezi-MOTION Plus-R GUI program.

Parameter Classification	Parameter Start Address	Description	Write Condition
Operating	0xA000	Drive information and network operation parameters	Servo Off
Drive Control	0xB000	Parameter for drive control	Servo Off
Motion Control	0xB100	Parameter of motion profile	Servo On
Origin Control	0xB200	Parameter of homing profile	Servo On
Ext. I/O Contorl	0xE000	Assignment information and level control of external I / O	Servo Off
Position Table	0x9000	Items in the position table	Servo On

5.1 Operating Parameter

Drive information and network operation parameters.

Pn#No.	GUI No.	Parameter Name	Description	Access	Unit	Minimum	Maximum	Default
Pn#A000h	-	Drive F/W Revision Info	Revision number of drive firmware	R	[digit]	-	-	-
Pn#A001h	-	Drive F/W Version Info	Drive firmware version	R	[digit]	-	-	-
Pn#A002h	-	Drive H/W Version Info	Drive hardware version	R	[digit]	-	-	-
Pn#A003h	-	Drive Major Version Info	Drive version	R	[digit]	-	-	-
Pn#A004h	-	Drive Version Info	Motor type number	R	[digit]	-	-	-
Pn#A005h	-	Motor Type Info	Occupancy status of CC-Link network	R	[digit]	-	-	-
Pn#A008h	-	CC-Link Occupied Stations Info	CC-Link Mode Switch Information	R	[Info]	1	4	-
Pn#A009h	-	CC-Link Mode Switch Info	CC-Link ID number	R	[digit]	-	-	-
Pn#A00Ah	-	CC-Link ID Info	RS485 communication network ID	R	[digit]	-	-	-
Pn#A010h	-	Ezi-MOTION Plus-R ID	RS485 communication speed	R	[digit]	0	15	0
Pn#A011h	-	Ezi-MOTION Plus-R Baud-Rate	Operating condition at emergency stop	R	[digit]	-	-	115,200
Pn#A020h	0	E-STOP Method	Operation condition when CC-Link network is disconnected	R/W	[digit]	0	1	0
Pn#A030h	1	Network Disconnection	Revision number of drive firmware	R/W	[digit]	0	3	0

5.1.1 Drive F/W Revision Info [Pn#A000]

This parameter is the firmware version of the drive and is the version information for the fix.

5.1.2 Drive F/W Version Info [Pn#A001]

This parameter is the firmware version of the drive and is the major version information.

5.1.3 Drive H/W Version Info [Pn#A002]

This parameter is the hardware version of the drive. It is the version information about the hardware specification.

5.1.4 Drive Major Version Info [Pn#A003]

This parameter is the main version information of the drive.

5.1.5 Dive Version Info [Pn#A004]

파라미터 [Pn#A000] ~ [Pn#A003] 까지의 버전 데이터로 16 진수로 확인해야 합니다.

5.1.6 Motor Type Info [Pn#A005]

The code representing the motor type. Depending on the motor applied to each drive, the motor number to be checked is different.

Parameter Value [info]	Motor Type	Parameter Value [info]	Motor Type
130	20M	120	56S
129	20L	132	56M
128	28S	117	56L
127	28M	146	60S
126	28L	147	60M
125	42S	148	60L
124	42M	153	86M
123	42L	154	86L
122	42XL	155	86XL

5.1.7 CC-Link Occupied Stations Info [Pn#A008]

Shows the station occupied by the CC-Link network applied by the setting of switch SW1 occupying the drive.

Parameter Value [info]	Operating Characteristic
1	1 station occupied mode
2	2 station occupied mode
3	3 station occupied mode
4	4 station occupied mode

5.1.8 CC-Link Mode Switch Info [Pn#A009]

Indicates the value applied by setting the mode switch SW2 of the drive. CC-Link communication setting speed is as follows.

Parameter Value [info]	CC-Link Communication Speed [bps]
0	156K
1	625K
2	2.5M
3	5M
4	10M

5.1.9 CC-Link ID Info [Pn#A00A]

Station No. setting switch of the drive CC-Link station number set by SW3 (X10) and SW4 (X1). It is displayed as set value of switch set at boot. If user wants to apply the changed ID after booting, re-boot the drive.

⚠ **Attention**	When the CC-Link mode and CC-Link ID are changed while a normal connection with the CC-Link network has been made, error messages "E- 400" and "E-300" are output from the display FND of the drive.

5.1.10 Ezi-MOTION Plus-R ID [Pn#A010]

The ID number for Ezi-MOTOIN Plus-R protocol is based on RS485. The default value is '0'.

5.1.11 Ezi-MOTION Plus-R Baud-Rate [Pn#A011]

Communication speed of Ezi-MOTOIN Plus-R protocol is based on RS485. The default value is '4' which is fixed at 115,200 [bps].

Parameter Value [info]	RS485 Communication Speed[bps]
115,200	115,200 (* Fixed value)

5.1.12 E-STOP Method [Pn#A020]

Selects the drive operation condition when the E-STOP instruction is executed.

Parameter Value [info]	Operating characteristic
0	E-STOP Only
1	Automatic Servo OFF after E-STOP

5.1.13 Network Disconnection [Pn#A030]

Select the drive operation condition when the CC-Link network is disconnected.

Parameter Value [info]	Operating characteristic
0	Stay current status
1	Execute E-STOP
2	Execute Servo OFF
3	Execute S-STOP

5.2 System Control Parameter

Drive control parameters are parameters that configure the environment when motor is connected to mechanical equipment. This parameter can be changed in the Step Off state

Pn#No.	GUI No.	Parameter Name	Description	Access	Unit	Minimum	Maximum	Default
Pn#B000h	2	Pulse Per Resolution	Pulse resolution for one revolution of the drive	R/W	[info]	0	8	8
Pn#B001h	3	S/W +Limit Value	Forward S / W Limit Points	R/W	[pulse]	-134,217,728	+134,217,727	+134,217,727
Pn#B002h	4	S/W -Limit Value	Reverse S / W limit point	R/W	[pulse]	-134,217,728	+134,217,727	-134,217,728
Pn#B003h	5	S/W Limit Stop Method	S / W Limit Stop method	R/W	[info]	0	2	0
Pn#B004h	6	H/W Limit Stop Method	H / W sensor input stop method	R/W	[info]	0	1	0
Pn#B008h	7	Motion Dir	Motion direction setting	R/W	[info]	0	1	0
Pn#B009h	8	Limit Sensor Dir	Direction of the limit signal setting	R/W	[info]	0	1	0
Pn#B00Bh	9	Brake Delay Time	Brake delay value	R/W	[msec]	10	5,000	200
Pn#B00Ch	10	Run Current	The ratio of the current flowing through the motor	R/W	X10[%]	5	15	10
Pn#B00Dh	11	Boost Current	Current ratio of motor used when motor is accelerated	R/W	X50[%]	0	7	0
Pn#B00Eh	12	Stop Current	Current ratio used by motor at stop	R/W	X10[%]	2	10	5

Pn#No.	GUI No.	Parameter Name	Description	Access	Unit	Minimum	Maximum	Default
Pn#B011h	64	Encoder Multiply	Encoder Multiplier Current ratio used by motor at stop	R/W	[info]	0	3	0
Pn#B012h	65	Encoder Dir	Encoder Direction	R/W	[info]	0	1	0
Pn#B020h	13	Mechanism Type Select	Type of Mechanical Equipment	R/W	[info]	0	3	0
Pn#B021h	14	Unit	Unit of Mechanical Equipment	R/W	10^{-n} [digit]	0	6	3
Pn#B022h	15	Input Gear	Input Gear of Mechanical Equipment	R/W	[digit]	1	1,000,000	1,000
Pn#B023h	16	Output Gear	Output gear of Mechanical Equipment	R/W	[digit]	1	1,000,000	1,000
Pn#B024h	17	Screw Lead	Screw Lead Information of Mechanical Equipment	R/W	[μm]	1	5,000,000	1,000
Pn#B025h	18	Pulley Diameter	Pulley Diameter of Mechanical Equipment	R/W	[μm]	1	5,000,000	1,000
Pn#B030h	19	Step Move Position Magnify	Position Multiplier of Step Move Command	R/W	[digit]	1	25,000,000	1,000

*The GUI No. is Parameter No. displayed in the parameter list window of Ezi-MOTION Plus-R GUI.

5.2.1 Pulse Per Resolution [Pn#B000h]

It means the number of pulses per motor rotation. This value can be changed in Step OFF state..

Parameter Value [info]	Number of pulses per revolution [ppr]
0	500
1	1000
2	1600
3	2000
4	3200
5	3600
6	4000
7	5000
8	6400
9	8000
10	10000
11	20000
12	25000
13	36000
14	40000
15	50000

5.2.2 S/W Limit ± Value [Pn#B001h], [Pn#B002h]

Set the maximum input limit value that can move in plus direction to 28bits when using the move command (absolute move, incremental move, Jog). Since it is treated as the actual position value (Command Position, Actual Position), it is applied as the value that executed Set Position and Clear Position command.

5.2.3 S/W Limit Stop Method [Pn#B003h]

Set the motor stop method by the Parameter S / W limit value

Parameter Value [info]	Operating Characteristic
0	Execute E-STOP
1	Execute S-STOP

2	Not applied S/W Limit

5.2.4 H/W Limit Stop Method [Pn#B004h]

Set the motor stop method by the Parameter H / W limit value.

Paramter Value [info]	Operating Characteristic
0	Execute E-STOP
1	Execute S-STOP

5.2.5 Motion Direction [Pn#B008h]

Set the direction of motor rotation when operating by position command.

Parameter Value [info]	Operating characteristic
0	Move in CW direction
1	Move in CCW direction

5.2.6 Limit Sensor Direction [Pn#B009h]

This function sets the direction of the limit signal to stop during operation up to the limit point. In a typical system, set the same as Parameter Motion Direction (Pn # B008h)

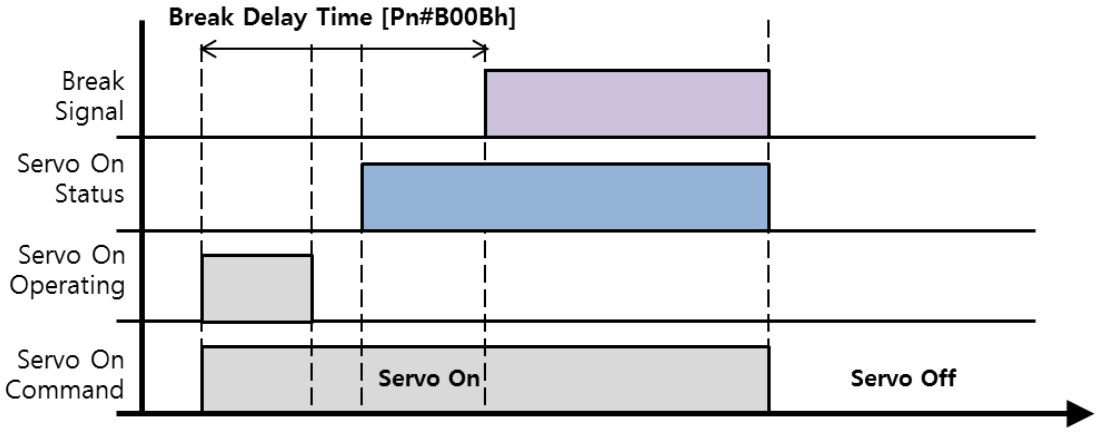
Parameter Value [info]	Operating characteristic
0	Stop by limit + signal when moving in CW direction
1	Stop by limit - signal when moving in CW direction

5.2.7 Pos. Error Overflow Limit [Pn#B00Ah]

This function protects the motor and the drive. If the 'Position Error' value becomes larger than this value when Step On status, the alarm is generated and the current supply to the motor is cut off and Servo OFF.

5.2.8 Brake Delay Time [Pn#B00Bh]

User can set the brake operation time according to Step ON command



5.2.9 Run, Boost, Stop Current [Pn#B00Ch], [Pn#B00Dh], [Pn#B00Eh]

Ezi-STEP2 CC-Link can minimize the heat generation by adjusting the motor current consumption variably according to the driving load condition of machine equipment. The Run Current and Stop Current can adjust the maximum and minimum values of the drive current and stop current of the motor according to the load during operation. Boost Current is a current control parameter to improve the mobility.

- Run Current [Pn#B00Ch]

  It is the current value that flows to the motor during drive operation and is set based on the rated current of the motor. This value is related to the torque that the motor is running. If this value is high, the torque during operation will increase. Therefore, when the value of this parameter is adjusted, it is possible to set the maximum drive torque of the motor in the range of 50 [%] ~ 150 [%] and the maximum current in 4 [A] in 10 [%] units.

Parameter Value X10[%]	Minimum	Maximum	Default
5~15	50[%]	150[%]	100[%]

5.2.10 Encoder Multiplier

Specify the multiplication of the encoder added to the Ezi-STEPII drive.

Parameter Value	Encoder Multiplier
0	No Encoder
1	X 1
2	X 2
3	X 4

5.2.11 Encoder Dir

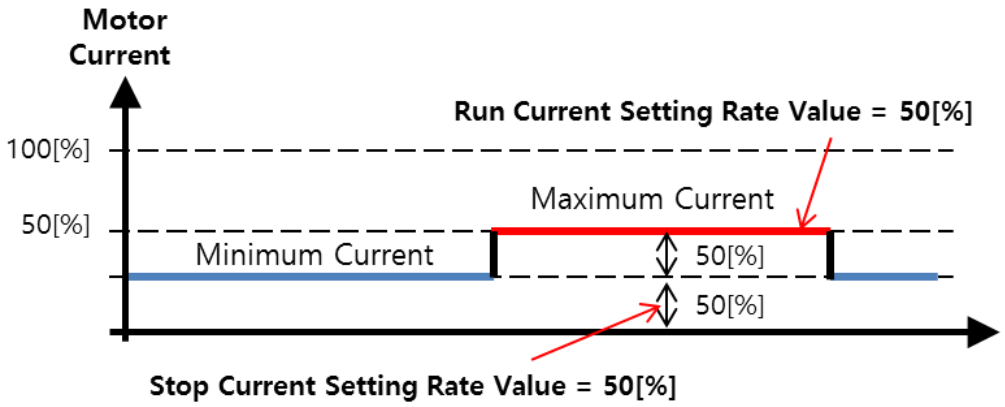
Define the rotation direction of the mounted encoder. When the encoder is installed and the motor direction is forward, if the encoder count is positive, set the direction CW and if it is negative, set the direction CCW so that the encoder count can be reversed.

Parameter Value	Encoder Direction
0	CW
1	CCW

Reference	Even if an encoder is added, closed-loop operation is not available.

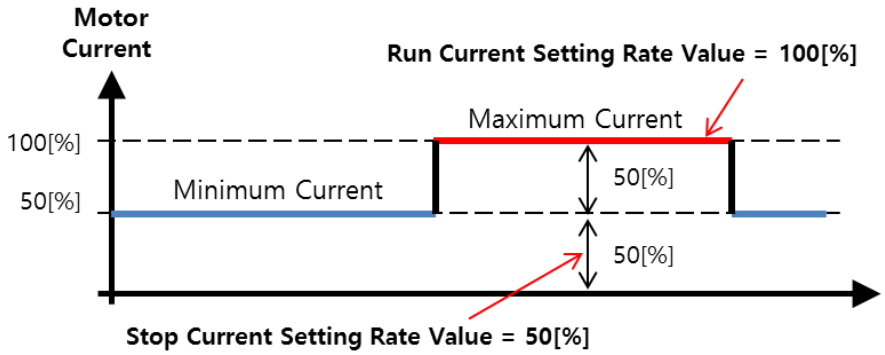
1) In case of the Run Current is set to 50 [%] (Pn # B00Ch = 5)

When using a motor whose rated current is 1 [A], the maximum current value for which the motor is used during operation is 0.5A. At this time, if Stop Current is 50%, it will operate from 0.25 [A] to 0.5 [A] for 1 [A] motor.



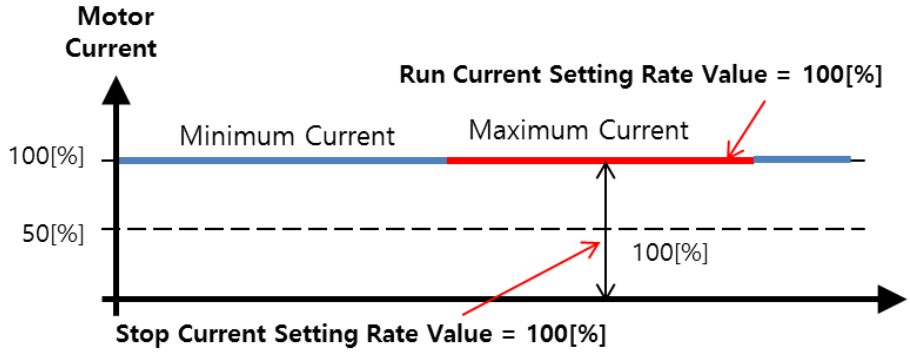
2) In case of the Run Current is set to 100 [%] (Pn # B00Ch = 10)

When using a motor with a rated current of 1.0 [A], the maximum current value at which the motor is used during operation is 1.0 [A]. At this time, if Stop Current is 50 [%], the minimum current of motor according to load is operated from 0.5 [A] to 1.0.



3) In case of Pn # B00Ch and Pn # B00Eh are set to '10' (Run Current and Stop Current are 100 [%])

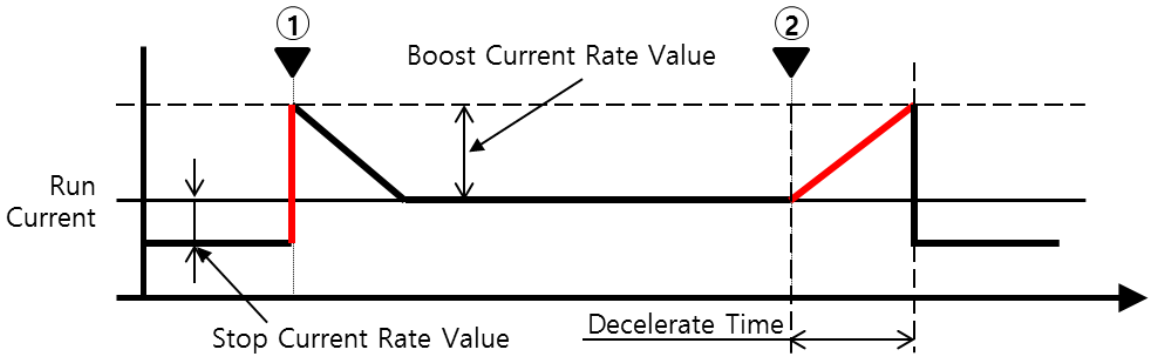
When the motor with rated current of 1.0 [A] is used and the Run Current and Stop Current are set to 100 [%], the motor's minimum current will be 1.0 [A] Regardless of the load, the Run Current is maintained at 1.0 [A] with 100 [%].



- Boost Current [Pn#B00Dh]

Boost Current is a parameter to increase the starting torque by temporarily supplying the driving current to the set value for a limited period when starting from the stop state. The motor accelerates to Boost Current at ①. After the acceleration is completed, the current decreases to run below the Run Current. At ②, the decelerating point, it decelerates to Boost Current. This parameter can be used to improve acceleration / deceleration performance.

Parameter Value X50[%]	Minimum	Maximum	Default
0~5	0[%]	350[%]	0[%]



- Stop Current [Pn#B00Eh]

  It describes the stop current (the minimum current value that flows through the motor) that is automatically set after 0.1 second after the motor stops running. The current used at this time is the current for holding the motor. This parameter is used to reduce heat when the motor is stopped for a long time. The current set by the Stop Current Parameter is not proportional to the rated current as specified in the motor specification, but is proportional to the set Parameter Run Current value.

Parameter Value X10[%]	Minimum	Maximum	Default
2~10	20[%]	100[%]	50[%]

For example, if the run current of the motor with rated current of 1 [A] is set to 150[%], the maximum motor current becomes 1.5 [A], and if the stop current is set to 50[%] 0.75 [A].

⚠ **Attention**	1) If the value of Run Current is high, the temperature of the motor's heat may rise. 2) The maximum setting value of the Run Current (150%) is limited to 4 [A]. Therefore, motors (56mm, 60mm) whose motor rated current exceeds 2.7[A] will not increase by the set value even if the set value is raised. 3) Therefore, use it only when the torque value during running is insufficient. 4) As same as Run Current, the control current is limited to 4 [A]. Motors(56 angles, 60 angles) whose rated current value exceeds 2.7 [A] will not increase by the set value even if the set value is raised.

5.2.12 Mechanism Type Select [Pn#B020h]

This is a parameter that makes the motor start to match the value of command, status information, setting value, etc., with the feed amount of the machine, depending on the type of machine. Depending on the mechanism, the calculation method for the transfer amount of the mechanical equipment is different. Therefore, it is calculated when the drive is booted according to the mechanism type and applied to the system.

Parameter Value [info]	System	Valid Parameter
0	Normal System	Pulse Per Resolution [Pn#B000h] Input Gear [Pn#B022h] Output Gear [Pn#B023h]
1	Ball Screw System (Lead Screw)	Pulse Per Resolution [Pn#B000h] Setting Unit : Unit [Pn#B021h] Drive axis gear information : Input Gear [Pn#B022h] Load axis gear information : Output Gear [Pn#B023h] Lead screw information : Screw Lead [Pn#B024h]
2	Belt & Pulley System (Conveyor System)	Pulse Per Resolution [Pn#B000h] Setting Unit : Unit [Pn#B021h] Drive axis gear information : Input Gear [Pn#B022h] Load axis gear information : Output Gear [Pn#B023h] 풀리 정보 : Pulley Diameter [Pn#B025h]
3	Rotary Index Table	Pulse Per Resolution [Pn#B000h] Setting Unit : Unit [Pn#B021h] Drive axis gear information : Input Gear [Pn#B022h] Load axis gear information : Output Gear [Pn#B023h]

5.2.13 Unit [Pn#B021h]

Specify the unit when the pulse information of the motor is converted into the feed amount information

Parameter Value [digit]	Contents
$X10^{-n}$ [digit]	In the default 1.000 [mm] increments, the higher the multiplier, the lower the decimal place ● When Value = 1, 0.100[mm] ● When Value = 3, 0.001[mm] or 1[μm] ● When Value = 6, 0.001[μm]

5.2.14 Reduction ratio (Input Gear [Pn#B022h], Output Gear [Pn#B023h])

When gearing with motors and machinery, set gear reduction ratio during power transmission

EX 1) When the reduction ratio is 1:30, the input gear is set to 1, and the output gear is set to 30

EX 2) When the reduction ratio is 1: 14.7, the input gear is set to 10, and the output gear is set to 147

EX 3) When the diameter of the pulley directly connected to the motor is 46.3 [mm], and the diameter of the pulley connected to the mechanical equipment is 120 [mm], the input gear is set to 463 and the output gear is set to 1200

5.2.15 Screw Lead [Pn#B024h]

Set the screw when the machine type is linear screw type. At this time, the input unit is μm

EX 1) When the ball screw lead is 2.5 [mm], it is set to 2,500

EX 2) When the ball screw lead is 2.5 [inch], 2.5 [inch] is multiplied by 25,400, and 2.5"× 25, 400 μm = 63,500 which converts the inch unit into μm unit

5.2.16 Pulley Diameter [Pn#B025h]

Set the pulley diameter in μm when the type of the machine is a conveyor type consisting of pulleys.

.

EX 1) When the diameter of the pulley is 34.7 mm, it is set to 34,700

⚠ **Attention**	If parameter Pn # B020h to Pn # B025h is set and applied to the system, it is calculated and applied by referring to Parameter Pulse Per Resolution [Pn # B000h], which indicates the number of pulses per motor rotation. Be careful when setting parameters. To apply this parameter to the system, save the parameter and reboot.

5.2.17 Step Move Position Magnify [Pn#B030h]

This parameter is used for step movement of Ezi-STEP2 CC-Link. When the step movement command is executed, the value of 1 to 15 is input and the magnification of this value is stored in the parameter. If the step movement value is set to '7' and the step movement command is executed, this parameter is multiplied by the step movement value 7

5.3 Motion Control Parameter

Motion control parameters are parameters that make up the motion profile. Pulse Per Revolution [Pn # B000h], which is a parameter indicating the number of pulses per rotation, is used as a reference. This parameter can also be changed to Step On status.

Pn#No.	GUI No.	Parameter Name	Description	Access	Unit	Minimum	Maximum	Default
Pn#B100h	20	Axis Max Speed	Motor driving maximum speed	R/W	[pps]	1	2,500,000	500,000
Pn#B101h	21	Axis Start Speed	Position move start speed	R/W	[pps]	1	350,000	1
Pn#B102h	22	Axis Accel Time	Position move acceleration time	R/W	[msec]	1	9,999	100
Pn#B103h	23	Axis Decel Time	Position move deceleration time	R/W	[info]	1	9,999	100
Pn#B104h	24	Speed Override	Input speed override	R/W	[%]	1	500	100
Pn#B105h	25	Jog Speed	Ext. Jog input speed	R/W	[pps]	1	2,500,000	5,000
Pn#B106h	26	Jog Start Speed	Jog start speed	R/W	[pps]	1	350,000	1
Pn#B107h	27	Jog Acc Dec Time	Jog Acc/Ded Time	R/W	[msec]	1	9,999	100

5.3.1 Axis Max Speed [Pn#B100h]

Specify the maximum speed that can be operated during the position movement command so that it will not be operated at a speed higher than this value in any case. Set the value in [pps] unit. The upper limit value range must be changed according to the Pulse Per Resolution value.

5.3.2 Axis Start Speed [Pn#B101h]

Set the operation start speed value at the position movement command.

5.3.3 Axis Accel/ Decel Time [Pn#B102h], [Pn#B103h]

Set the acceleration section time value in [msec] unit at the start of operation in position movement command. The applicable range is limited by Axis Speed.

EX 1) Axis Start Speed=1 [pps], Move Speed=500,000 [pps] : 1~9,999 [msec]
EX 2) Axis Start Speed=1 [pps], Move Speed=400,000 [pps] : 1~1,430 [msec]
EX 3) Axis Start Speed=1 [pps], Move Speed=10,000 [pps] : 1~350 [msec]

5.3.4 Speed Override [Pn#B104h]

The operation speed changes according to the ratio value specified at the currently specified 'Move Speed' at the position movement command.
EX 1) If the current Move Speed is 10,000 and the Speed Override is 200 [%], the actual motion speed is 20,000.

5.3.5 Jog Speed [Pn#B105h]

It is the motor rotation speed value when Jog operation command assigned as external input is executed. The unit to be set is [pps].

5.3.6 Jog Start Speed [Pn#B106h]

It is operation start speed value when Jog operation command assigned as external input is executed.

5.3.7 Jog Accel/Decel Time [Pn#B107h]

It is time value of acceleration section and deceleration section during Jog operation.

5.4 Homing Parameter

The homing parameter is used to specify the mechanical origin.

Pn#No.	GUI No.	Parameter Name	Description	Access	Unit	Minimum	Maximum	Default
Pn#B200h	28	Homing Method	Setting of homing command type	R/W	[info]	0	9	0
Pn#B201h	29	Homing Speed	Speed value to the point where the origin is detected	R/W	[pps]	1	500,000	5,000
Pn#B202h	30	Homing Search Speed	Speed value for redetection at the point where the origin is detected	R/W	[msec]	1	500,000	1,000
Pn#B203h	31	Homing Acc Dec Time	ACC/Dec time during homing operation	R/W	[msec]	1	9,999	50
Pn#B204h	32	Homing Dir	Homing direction	R/W	[info]	0	1	0
Pn#B205h	33	Homing Offset	Move value after homing	R/W	[pulse]	-134,217,728	+134,217,727	0
Pn#B206h	34	Homing Position Set	Position setting value after completion of homing	R/W	[pulse]	-134,217,728	+134,217,727	0
Pn#B208h	63	Org Start Speed	Origin returning start speed	R/W	[pps]	1	500,000	1

5.4.1 Homing Method [Pn#B200h]

Homing Method Parameter is a parameter to select homing method. The homing method is as follows.

Method Number.	Method Type
0x00	Homing profile of "Origin"
0x01	Homing Profile of "Z-Origin"
0x02	Homing Profile of "Limit Origin"
0x03	Homing Profile of "Z Limit Origin
0x04	Homing Profile of "Z Phase"
0x05	Set Origin

5.4.2 Homing Speed [Pn#B201h]

It is the operation speed value that moves to the origin detecting point at homing command

5.4.3 Homing Search Speed [Pn#B202h]

It is the low speed operation speed value for returning to the zero point accuracy after reaching the origin detecting point at homing command

5.4.4 Homing Accel/Decel Time [Pn#B203h]

It is time of acceleration and deceleration sections of operation start /end part in homing command.

5.4.5 Homing Dir [Pn#B204h]

Sets the rotation direction of the motor when homing operation.

Parameter Value [info]	Operating characteristic
0	Move in CW direction (Positive direction)
1	Move in CCW direction (Negative direction)

5.4.6 Homing Offset [Pn#B205h]

After returning to home position, it moves further by the position of this set value, stops after it, and completes homing operation. When this command is completed, it is assigned to the value stored in the Homing Position Set [Pn # B206h] parameter.

5.4.7 Homing Position Set [Pn#B206h]

After homing is completed, it is assigned to the value stored in this parameter.

5.4.8 Homing Start Speed [Pn#B208h]

This is the initial speed information when starting from the stop status in the homing profile. If this value is set too high, an overload or position tracking alarm may occur when returning to the origin.

5.5 External I/O Setting

User can set the input / output signal assignment and signal level of CN1 of the drive as an external input / output setting parameter.

Pn#No.	GUI No.	Parameter Name	Data Size	Description
Pn#E000h	35	Limit Sensor Logic	1 [bit]	Set the level of H / W Limit signal
Pn#E001h	36	Org Sensor Logic	1 [bit]	Set the signal level of origin sensor
Pn#E011h	37	Input 1 Mapping	1 [bit]	Set operation command of input signal
Pn#E012h	38	Input 2 Mapping	1 [bit]	
Pn#E013h	39	Input 3 Mapping	1 [bit]	
Pn#E014h	40	Input 4 Mapping	1 [bit]	
Pn#E015h	41	Input 5 Mapping	1 [bit]	
Pn#E016h	42	Input 6 Mapping	1 [bit]	
Pn#E017h	43	Input 7 Mapping	1 [bit]	
Pn#E021h	44	Output 1 Mapping	1 [bit]	Set operation command of output signal
Pn#E022h	45	Output 2 Mapping	1 [bit]	
Pn#E023h	46	Output 3 Mapping	1 [bit]	
Pn#E024h	47	Output 4 Mapping	1 [bit]	
Pn#E025h	48	Output 5 Mapping	1 [bit]	
Pn#E026h	49	Output 6 Mapping	1 [bit]	
Pn#E030h		DWORD Input Level	1 [WORD]	Set the input level in combination.
Pn#E031h	50	Input 1 Level	1 [bit]	Sets the level of the input signal in bits.
Pn#E032h	51	Input 2 Level	1 [bit]	
Pn#E033h	52	Input 3 Level	1 [bit]	
Pn#E034h	53	Input 4 Level	1 [bit]	
Pn#E035h	54	Input 5 Level	1 [bit]	
Pn#E036h	55	Input 6 Level	1 [bit]	
Pn#E037h	56	Input 7 Level	1 [bit]	
Pn#E040h		DWORD Output Level	1 [WORD]	Set the output level in combination.
Pn#E041h	57	Output 1 Level	1 [bit]	Set the output signal level in bits.
Pn#E042h	58	Output 2 Level	1 [bit]	
Pn#E043h	59	Output 3 Level	1 [bit]	
Pn#E044h	60	Output 4 Level	1 [bit]	
Pn#E045h	61	Output 5 Level	1 [bit]	
Pn#E046h	62	Output 6 Level	1 [bit]	

5.5.1 Setting Level of H/W Limit Signal and Origin Signal

H / W ± Limit signal is assigned to 1 and 2, and the origin signal is assigned to 3 of CN1. Then, user can set the level of the input signal. At this time, the levels of H / W + Limit signal and H / W -limit signal are simultaneously changed to Parameter Limit Sensor Logic [Pn # E000h].

⚠ **Attention**	The level of the H / W Limit signal is the same. Therefore, when one limit sensor is A contact, another limit sensor must be used as A contact type.

5.5.2 Input Signal Setting

The signal input to CN1 is programmable. The input signal to the drive can be assigned as follows.

Parameter Value [info]		Function	Parameter Value [info]		Function	CC-Link Remote Command	Parameter Value [info]		Function	CC-Link Remote Command
[DEC]	[HEX]		[DEC]	[HEX]			[DEC]	[HEX]		
0	0x00	No Function	16	0x10	E-STOP	Allowed	32	0x20	PT A0	Separate Command Respond at PT Start signal
1	0x01	User Input 1	17	0x11	MOTOR Enable	Allowed Simultaneously	33	0x21	PT A1	
2	0x02	User Input 2	18	0x12	Alarm Reset	Allowed	34	0x22	PT A2	
3	0x03	User Input 3	19	0x13	S-STOP	Allowed	35	0x23	PT A3	
4	0x04	User Input 4	20	0x14	Home Search	Not Allowed	36	0x24	PT A4	
5	0x05	User Input 5	21	0x15	Clear Position	Allowed	37	0x25	PT A5	
6	0x06	User Input 6	22	0x16	JOG +	Not Allowed	38	0x26	PT A6	
7	0x07	User Input 7	23	0x17	JOG -	Not Allowed	39	0x27	PT A7	
			24	0x18	STEP +	Not Allowed	40	0x28	PT Start	Not Allowed
			25	0x19	STEP -	Not Allowed	41	0x29	Single PT	Not Allowed

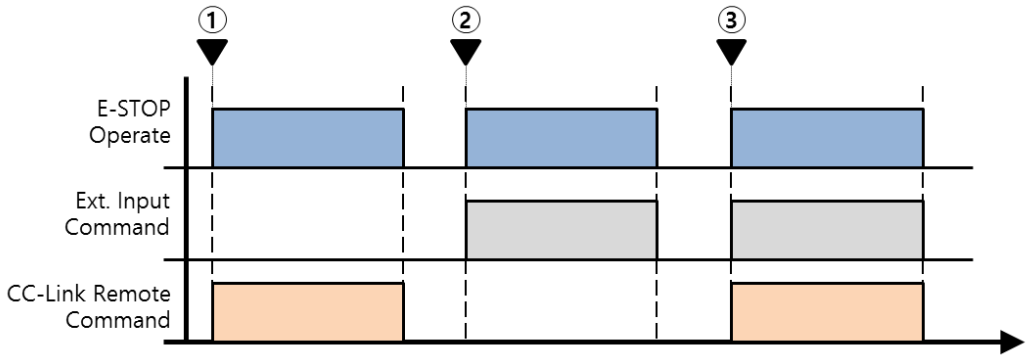
			26	0x1A	Go Zero Position	Not Allowed				
			27	0x1B	Pause	Not Allowed				
			28	`0x1C	Teaching	Not Allowed				

1) User Input 1~7 : 0x01 ~ 0x07

The User Input does not operate as a function of the drive with actual input signal and can be used as an input signal to be processed by the master controller.

2) E-STOP : 0x10

As an input signal to execute the emergency stop command, when this signal is input, no motion command is executed. When E-STOP command is executed by remote command of CC-Link, E-STOP function is executed even if external input signal is not input as ①. Also, ESTOP function is executed even if only external input signal is input as shown in ②. Even if both methods are executed simultaneously, E-STOP function is executed as shown in ③

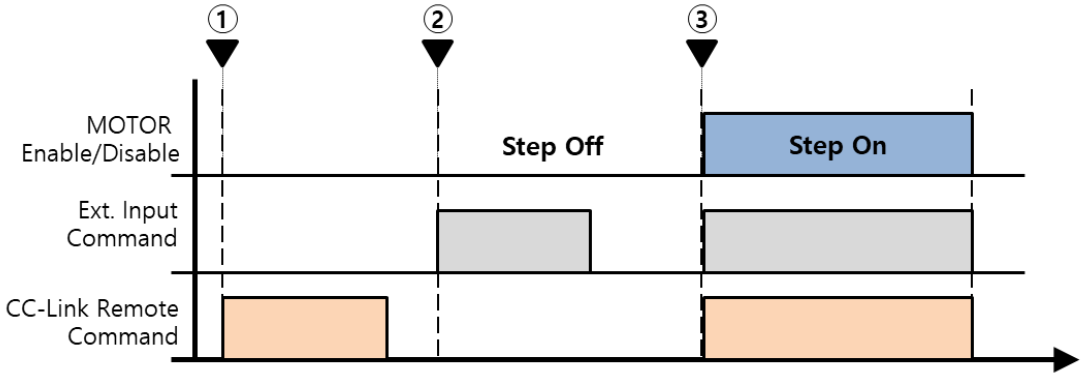


『 Refer to : E-STOP (Emergency Stop) 』

1) MOTOR Enable : 0x11

As an input signal to execute the MOTOR On command, MOTOR On / Off is executed according to this signal. If the MOTOR Enable command is assigned to the external input signal, MOTOR On does not work even if a CC-Link remote command exists as shown in <1>.

Also, even if the MOTOR On command is executed with external input as shown in ②, the drive does not execute MOTOR On operation. If the CC-Link remote command and external input command exist as shown in ③, execute the MOTOR On motion.



『 Refer to : Servo On/Off 와 Alarm Reset 』

3) Alarm Reset : 0x12

When the alarm is generated by the protection function of the drive, there is an alarm reset command as a method for releasing the alarm state without rebooting the drive after eliminating the cause. It can be assigned to external input signal and can be processed simultaneously with CC-Link remote command.

4) S-STOP : 0x13

When the motor is running, it is used to execute the stop command with deceleration information. It can be assigned to an external input signal and processed simultaneously with the CC-Link remote command.

5) Home Search : 0x14

Homing command is executed when setting mechanical origin of mechanical equipment.

When this command is assigned to an external input signal, it cannot be executed by CCLink remote command.

6) Clear Position : 0x15

This command is used to specify the current position as '0'. When this command is assigned to an external input signal, it cannot be executed by CC-Link remote command.

7) JOG +, JOG – : 0x16, 0x17

This command is used to execute a motion command that moves to the limit point while the command is being held. When this command is assigned to an external input signal, it cannot be executed by CC-Link remote command.

8) Step Move +, Step - : 0x18, 0x19

When a step move command is used that is moved by the input position value while the command is being maintained, it cannot be executed by the CC-Link remote command.

9) Go Zero Position : 0x1A

The Move to Zero command, which is a command to move to the position where the homing command has been executed, cannot be executed in the CC-Link remote command

when it is assigned to an external input signal.

10) Pause : 0x1B

The Pause command that pauses during operation cannot be executed by the CC-Link remote command when it is assigned to an external input signal.

5.5.3 Output Signal Setting

The status information of the drive can be output with CN1. The output signal is programmable. The output signal to the drive can be assigned as follows.

Parameter Value [info]	Function	Parameter Value [info]	Function
0x00	No function	0x10	Motioning
0x01	User Output 1	0x11	Servo Ready
0x02	User Output 2	0x12	Run/STOP
0x03	User Output 3	0x13	Alarm
0x04	User Output 4	0x14	-
0x05	User Output 5	0x15	Accel/Decel
0x06	User Output 6	0x16	Motion Direction
		0x17	ACK
		0x18	END
		0x19	Homing
		0x1A	Homing Ok
		0x1B	Warning

1) User Output 1~7 : 0x01 ~ 0x06

The user output is output by the master controller by the output command. This signal is independent of the drive's status information.

2) Motioning : 0x10

Output when the motor is running.

3) In-Position : 0x11

Output the positioning completion status.

4) Alarm : 0x12

To Output the alarm status.

5) Accel/Decel : 0x15

To indicate the acceleration / deceleration status during operation.

6) Motion Direction : 0x16

To indicate the direction of operation.

7) ACK : 0x17

To indicates in PT operation.

8) END : 0x18

To indicate that PT operation is completed.

9) Homing : 0x19

To indicates that the current motion is in the homing state.

10) Homing OK : 0x1A

To indicates that homing has been completed.

11) Warning : 0x1B

To indicates the error status for the command.

5.6 Position Table Parameter

The items of the position table are accessed by the parameter number of CC-Link I / O Map. Parameter number is WORD unit, upper byte is PT item, lower byte is PT number.

High	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Device Address	Position Table Item No.								Position Table No.							

Ex) When the target position value of PT No. 14 is changed, the upper device value is 0x810E.

The items in the position table are as follows. Refer to the "Ezi-SERVO Plus-R Position Table Function" in the User's Manual for the operation of the corresponding command.

Remote PT Item No	Setting Item	Description	Unit	Lower	Upper
80h	Command (Command typze)	Specifies the type of motion action to be executed.	-	0	11
81h	Position (Movement amount)	Position / movement amount is set by pulse.	pulse	-134,217,728	+134,217,727
82h	Low Speed (Low speed operation speed)	Set the number of pulses according to the type of motion operation.	pps	1	500,000
83h	High Speed (High-speed operation speed)	Set the number of pulses according to the type of motion operation.	pps	1	2,500,000
84h	ACC time (Acceleration time)	Sets the acceleration time at the start of motion operation in msec.	ms	1	9,999
85h	DEC time (Deceleration time)	Set the deceleration time at the end of motion operation in msec.	ms	1	9,999
86h	Wait time (waiting time)	When the PT number item is set to be jumped, the waiting time until the next position operation starts is set in units of msec. If JP Table No is set to 'blank' and Continuous Action is checked, this item	ms	0	60,000

Remote PT Item No	Setting Item	Description	Unit	Lower	Upper
		will be ignored.			
87h	Continuous action (Continuous operation enabled / disabled)	If set to check (1), it will link the current position with the next position action.	-	0	1
88h	JP Table No. (Jump position number)	After the position operation ends, the position operation of the jump PT is executed automatically.	-	0	255
8Ch	Loop Count (Loop count)	After execution of the number of times of setting the position (number of loops), jump to a separate correspondence number (jump position number after loop) different from "jump position number".	-	0	100
8Dh	Loop Jump Table No.		-	0	255
	(Jump position number after loop)			10,000	10,255
8Fh	Loop Counter Clear (Loop clear)	Clear the number of loops of the position number for the set number.	-	0	255

6. Position Table

The word position table is also referred to as PT(Position Table) in the text below. PT commands the motor's motion profile and processing command by PT number and is managed / stored in drive memory. This can be done in sequential operation, repetitive operation and single operation as required.

When the PT operation is executed, the loop operation in the PT is completed until the drive is turned off, even if the host controller does not command. At this time, operation of H / W Limit and S / W Limit is valid, but PT operation is not canceled.

In motion stop status as "Wait time" which makes delay operation when operating PT among PT items completes the operation, it is not executed even if commanding motion command. At this time, execute after confirming that [RX0B : PT Running] bit is Off.
For the PT operation command method, refer to "4.17 PT Operation".

Reference	The description of "Position Table" in this manual describes the functions of the position table of Ezi-STEPII CC-Link and Ezi-STEPII CC-Link. Unless otherwise noted, the features of both products work the same.
Warning	In case of equipment shutdown during PT operation, stop command must be executed. If it is performed in batch repeat operation, it repeats continuously unless the power of drive is turn off.

6.1 PT Item

PT Item is the property information of the selected table. For example, when the selected PT number is executed, there will be information about what action to perform, what speed, position, waiting time after the completion of motion, and jump PT number selection for execution.

For how to access the PT items, refer to the section "4.20 Parameter Access" and "5.6 Position Table Parameters.

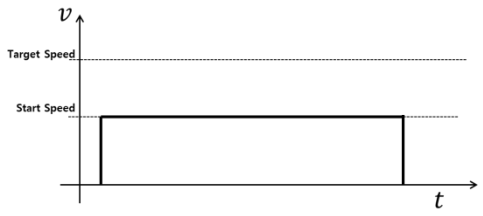
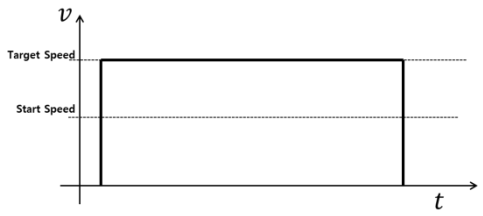
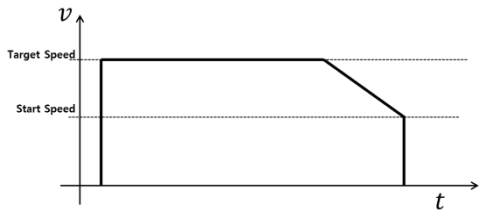
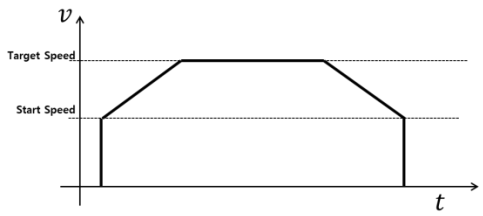
Reference	The access parameter number is written in the title of the item below "6.1 PT item". The lower byte [nnh] among the parameters written is the PT number of the corresponding item. For example, Pn # 8010h is PT Command of PT 16.

6.1.1 PT Command [Pn#80nnh]

Determine operating characteristics of selected PT. The types of PT operation are as follows.

PT Command No.	PT Command Item	Description
0	Abs Move low speed.	Position value is absolute position value. -Teaching function available. -Continuous operation function is available.
1	Abs Move high speed.	
2	Abs Move high speed with deceleration.	
3	Abs Move with acceleration and deceleration.	
4	Inc Move low speed.	Position value is incremental position value -Teaching function is not available. -Continuous operation function is available.
5	Inc Move high speed	
6	Inc Move high speed with deceleration.	
7	Inc Move with acceleration and deceleration.	
8	Move to Origin	Executes move to origin command according to the currently set parameter value.
9	Clear Position	In current position, reset 'command position' value and 'actual position' value to '0'.
10	Stop	Command to stop the motion

Motion Profile of Position Move Command

PT Command Name	PT Command No.	Motion Profile
Abs Move low speed.	0	
Inc Move low speed.	4	
Abs Move high speed	1	
Inc Move high speed	5	
Abs Move high speed with deceleration.	2	
Inc Move high speed with deceleration.	6	
Abs Move with acceleration and deceleration.	3	
Inc Move with acceleration and deceleration.	7	

Attention	There is no Push Motion Command in Ezi-STEPII CC-Link. Thus, PT Command number is not the same as the structure of Ezi-STEPII CC-Link.
Reference	Fixed time move command is a unique function of Ezi-SERVOII CC-Link and Ezi-STEPII CC-Link, but it is not included in the position table command.

6.1.2 Position [Pn#81nnh]

The position value area to move to. If the command condition of PT Command is absolute position shift, it becomes "Abs Position Value" and if relative position shift is "Inc Position Value".

6.1.3 Low Speed [Pn#82nnh]

When normal motion operation is executed, it becomes "Start Speed" used.
When PT Command is Move Low Speed, it is applied as "Target Speed".

6.1.4 High Speed [Pn#83nnh]

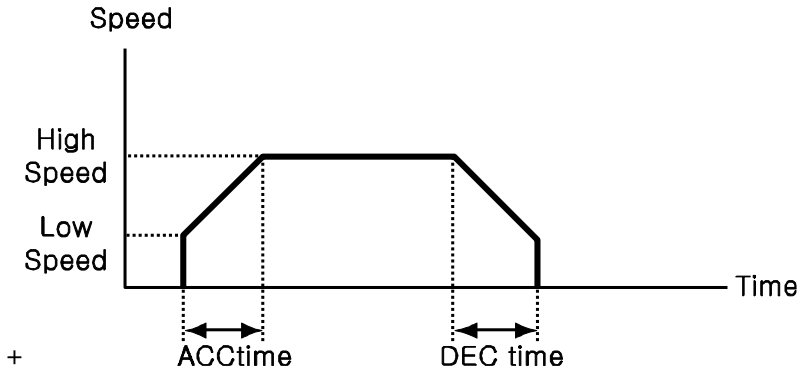
It becomes "Target Speed" in normal motion operation. When PT Command is Move High Speed, it is applied as "Target Speed".

6.1.5 ACC Time [Pn#84nnh]

It is the time to accelerate when the motion starts. When the command is executed in fixed time move mode, when RWw3 is 0, it operates with the value of this parameter.

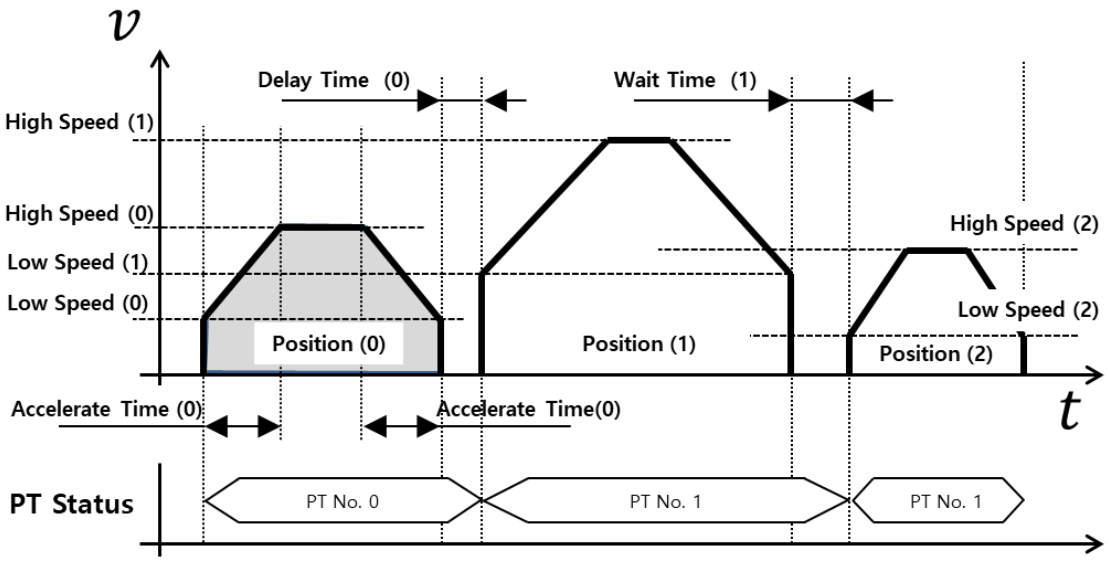
6.1.6 DEC Time [Pn#85nnh]

Deceleration time at the end of motion. When the command is executed in fixed time move mode, when RWw3 is 0, it operates with the value of this parameter.



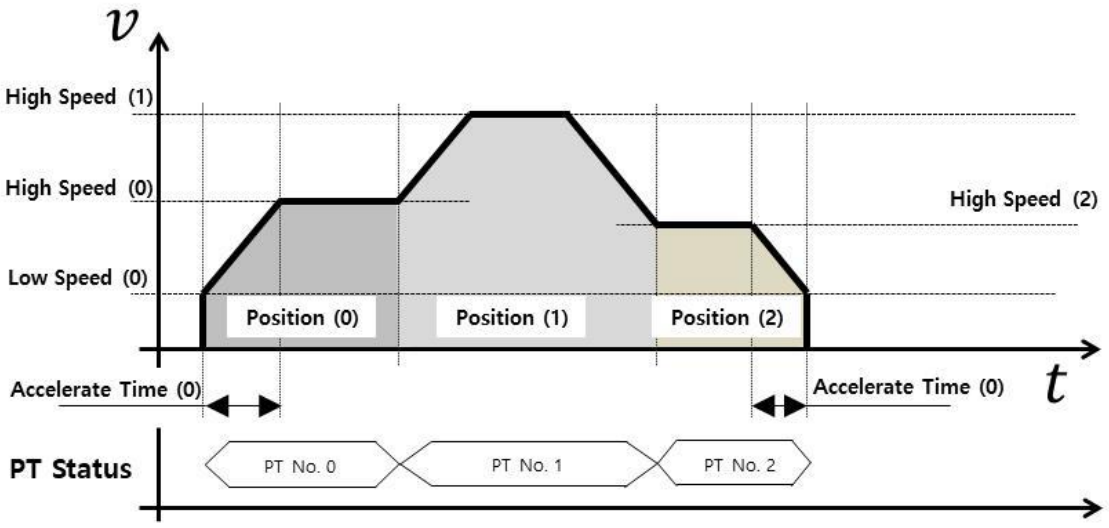
6.1.7 Wait Time [Pn#86nnh]

Delay the completion time of PT operation. If the operation is completed, it waits for the input time and outputs PT Running status. At this time, the time that Wait Time is applied is displayed as the number of the relevant PT, as shown below.



6.1.8 Continuous action [Pn#87nnh]

If this item is set as '1', it is executed by speed override and position override command to connect the current position to the next position action. If there is PT continuously with Continuous action set to 1, it operates without using Wait Time as shown below.
Also, the deceleration time when the PT connected to all Continuous actions ends is decelerated to the deceleration time of the first PT started.



6.1.9 JP Table No. [Pn#88nnh]

Complete the operation of the relevant PT number and enter the PT number to operate next. If you configure PT to end without continuous operation, input '-1' or 65,535 (0xFFFF) in 16bit [WORD]. (Ezi-MOTION PlusR GUI treats the value as blank.) Even if single PT command is executed, only the PT selected by the number regardless of this item is terminated after executing.

6.1.10 Loop Count [Pn#89nnh]

Loop Count is the count of repeating PT number during PT batch repeat operation. This count is maintained until the end of PT operation, stop command, and Loop Count Clear command.

6.1.11 Loop Jump Table No [Pn#8Annh]

This is the number to be jumped because the number of batch repeat operation is executed more than Loop Count. If you input '-1' or 65,535 (0xFFFF) in 16bit [WORD], PT operation is terminated when the condition is met.

6.1.12 Loop Counter Clear [Pn#8Bnnh]

Loop Counter is kept counted number until PT operation is completed. Loop counter of PT number used in this item is cleared to '0' during PT operation.

■ **Example of Jump Table and Loop Count**

[Operation Condition] : After repeating the specific section (P1 ~ P3) three times, move to the common position A and B and start again at the specific section (P1 ~ P3).

[Operation Sequence] : (P1 -> P2 -> P3) -> ()P1 -> P2-> P3) -> (P1 -> P2 -> P3) -> (A -> B) -> (P1 -> P2 -> P3) -> (P1...

PT Composition

PT No.	PT Command	Position Profile	Jump Table No.	Loop Count	Loop Jump Table No.	Loop Count Clear
...		...	...	...		
13	4	P1	14	...		
14	4	P2	15	...		
15	4	P3	27	3	27	
...			...			
27	4	A	27	...		
28	4	B	13	...		15

Reference

The above PT item, Position Profile, is a condition for position movement. That is, the target position, moving speed, and acceleration / deceleration time.

6.2 Normal PT

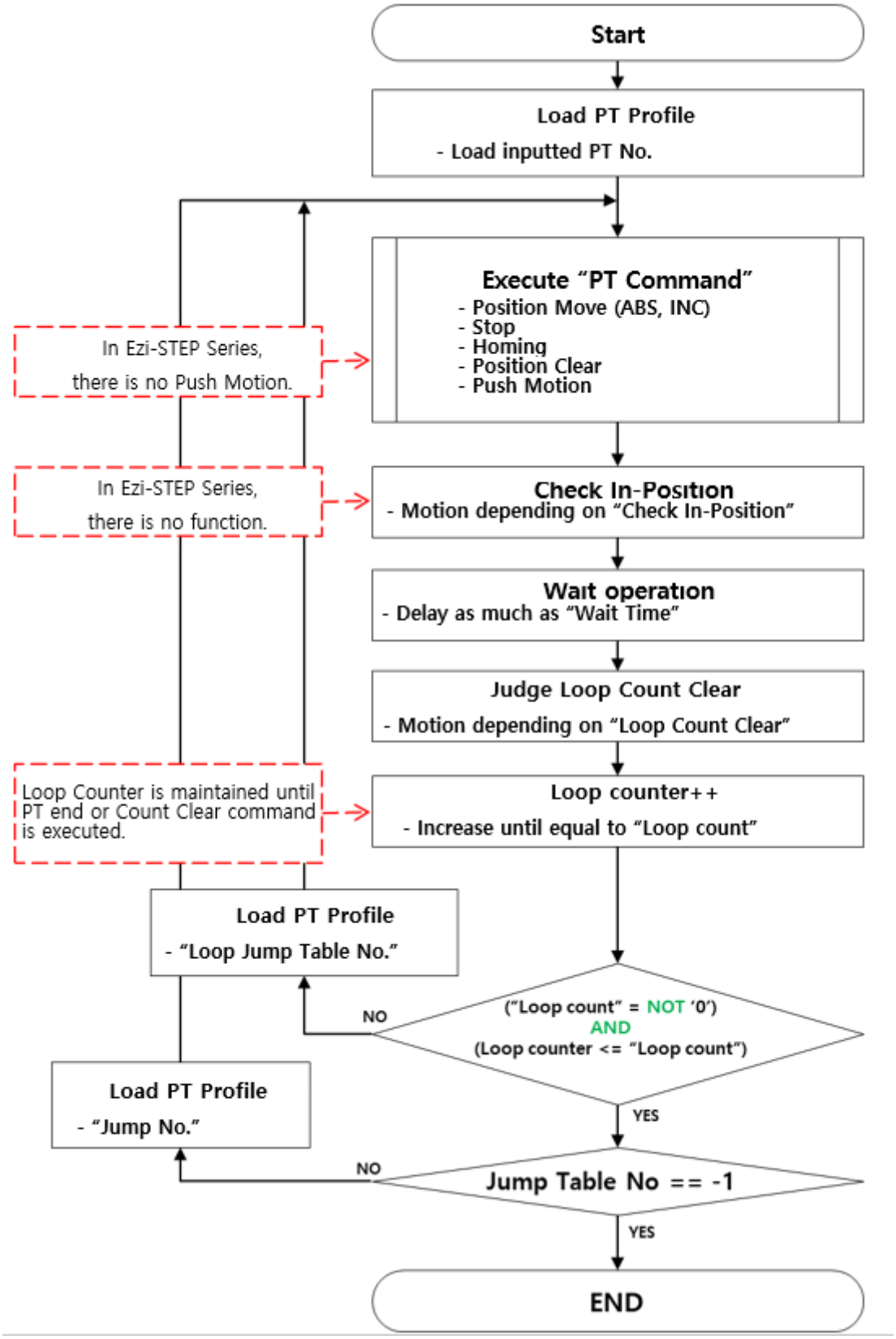
Normal PT operation is executed by the condition of the set value of Jump Table No. item by every set PT.

- If there are valid value in Jump Table No., continuous operation is executed by operation of the valid PT number.
- In case of invalid value, when the written value in Jump Table No. is set as same value or 65535[u16], -1[s16], 0xFFFF[word], which are difference of data form, PT Running bit becomes OFF.

The order of continuous operation is determined by the following items.

PT Item	Description
Continuous action	**FALSE :** After the current PT operation is completed and waits as long as Wait Time, operation is connected to PT number of valid Jump Table No. In case of an invalid Jump Tale No., PT operation is terminated after waiting for Wait Time. **TRUE :** The current position and the next position action written in the Jump Table No. are linked by the override command. At this time, the value set in Wait Time is ignored.
Jump Table No.	After the position movement is completed, the position movement of jump PT is executed automatically.
Loop Count	After execution of the number of positions set (loop count), jump to the corresponding jump number (Loop Jump Table No.) different from the 「jump position number」. Loop Count value is cleared when executing PT with Loop Count Clear.
Loop Jump Table No.	When the loop is executed as much as the Loop Count, it is the PT number to be moved.

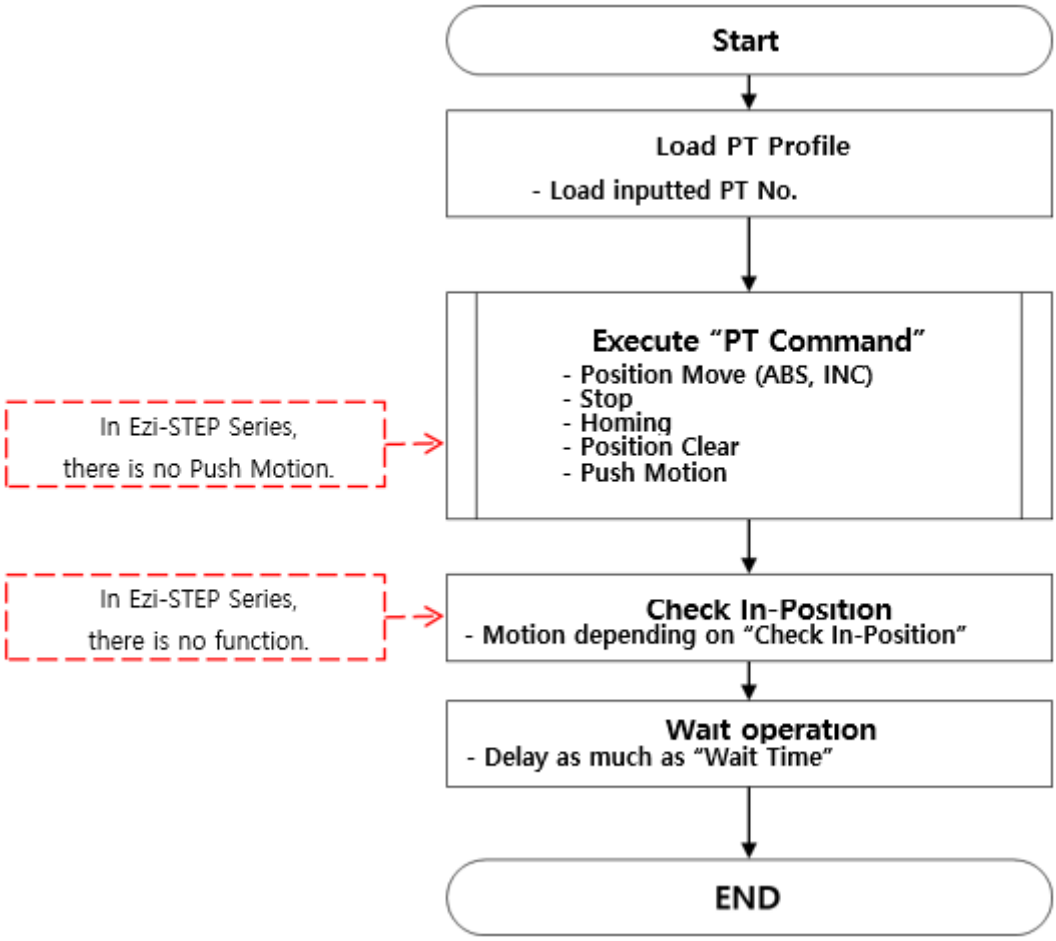
The general PT operation is operated by the following flow chart. This process can be stopped with a stop command.



6.3 Single PT

Single PT is a command to execute only one profile of recorded PT. "Jump Table No" and "Loop Count" information used in normal PT operation is not used.

The flow chart of the single PT command is as follows.



In the single PT, after operation of PT command and INP check, the PT operation ends after waiting for "Wait Time". Therefore, when commanding PT operated in normal PT as single PT, pay attention to Wait Time value.

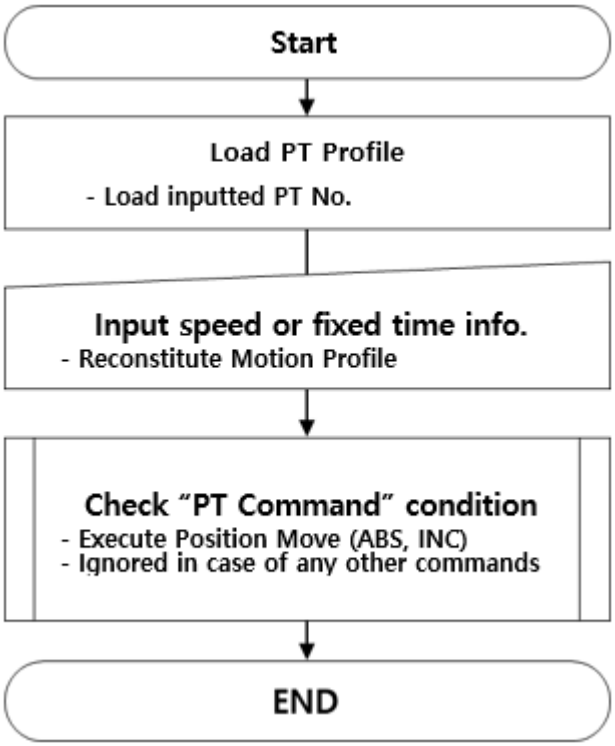
6.4 PT Point Move

In an environment using multiple masters, it is difficult to share point information for that axis. Therefore, the command method to assign a value to the axis and to move to the designated memory area is useful. This drive has a command to move using the speed entered in the position information stored in PT as point move command.

The method to check whether the characteristic of the point is absolute or incremental is using the information stored in PT Command, as shown in the following table.

[Pn#80nn] PT Command No.	PT Command Item	Position Move
0	Abs Move low speed.	Abs Position Move
1	Abs Move high speed.	
2	Abs Move high speed with deceleration.	
3	Abs Move with acceleration and deceleration.	
4	Inc Move low speed.	Inc Position Move
5	Inc Move high speed	
6	Inc Move high speed with deceleration.	
7	Inc Move with acceleration and deceleration.	

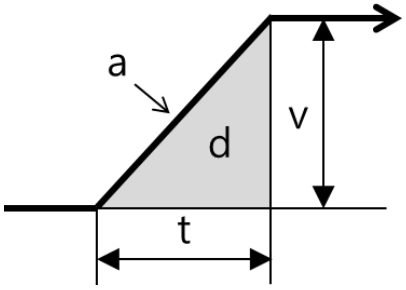
If there is no acceleration / deceleration information at the command instruction, (when value is '0'), the acceleration / deceleration information of the relevant PT is used, and the operation is performed as in the following flow chart.



7. Motion Profile

The motion profile is the control path for the motor to drive to the target position. It is common for a trapezoidal speed profile to generate information to control speed and position so that the motor follows it.

The components of the motion profile consist of moving distance, speed, time, and acceleration / deceleration information.



d : *distance*
v : *velocity*
a : *acceleration*
t : *time*

In the above profile, the moving distance (S) is the area of the profile, the velocity (v) is the height of the profile, time (t) is the progress, and acceleration / deceleration (a) can be expressed as a slope.

The information of the elements of the motion profile is organized into the following formulas.

Movement distance in motion profile without acceleration / deceleration information : $d = v \times t \times {}^{1}/_{2}$ Formula (1)

Moving distance in motion profile without time information

: $d = (v)^2 \times {}^{1}/_{2} \cdot a$ Formula (2)

Move distance in a motion profile without velocity information

: $d = a \times (t)^2 \times {}^{1}/_{2}$ Formula (3)

Acc/ deceleration information in a motion profile without position information : $a = {}^{v}/_{t}$ Formula (4)

Acc / deceleration information in a motion profile without time information

: $a = {}^{v^2}/_{2 \cdot d}$ Formula (5)

Acc / deceleration information in a motion profile without velocity information : $a = {}^{2 \cdot d}/_{t^2}$ Formula (6)

Time information in a motion profile without location information

: $t = {}^{v}/_{a}$ Formula (7)

Time information in motion profile without acc / deceleration information

: $t = {}^{2 \cdot d}/_{v}$ Formula (8)

Time information in a motion profile without rate information

: $\mathrm{t} = v \cdot \left({}^{2 \cdot d}/_{a}\right)$ Formula (9)

Speed information in a motion profile without location information

: $\mathrm{v} = a \times t$ Formula (10)

Speed information in motion profile without acc/ deceleration information

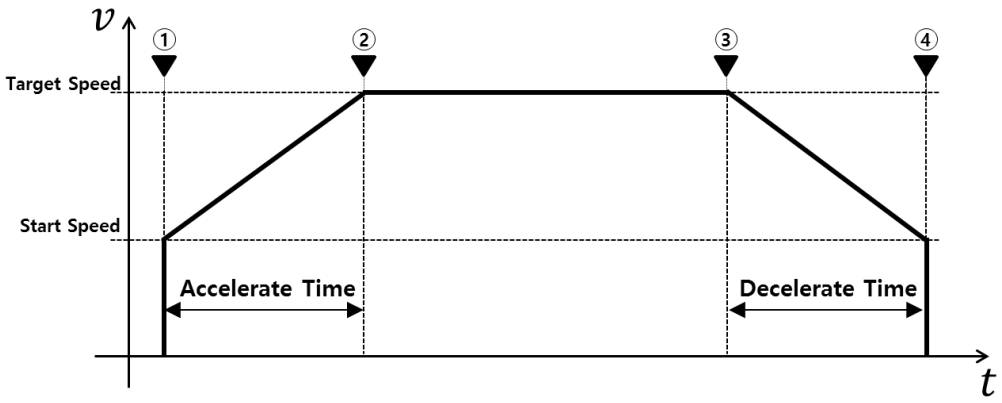
: $\mathrm{v} = {}^{2 \cdot d}/_{t}$ Formula (11)

Speed information in a motion profile without time information

: $\mathrm{v} = v \cdot (2 \cdot a \times d)$ Formula (12)

7. Motion Profile

The basic motion profile of Ezi-STEPII CC-Link is as follows.



Increase the speed from ① to ② as Target Speed to start motion with Start Speed information in motion operation. The time information for this process is the Accelerate Timing. Then, it decelerates to the start speed during decelerate time at the point ③ before reaching the target position ④ and then stops. If the start speed is equal to the target speed, the acceleration / deceleration time becomes 0 [msec], and a rectangular motion profile is created.

In the motion profile, the target speed is used as the commanded value. Here, the input speed command value is changed and applied according to the ratio value of Parameter Speed Override [Pn # B104h]. The items and parameters used in the motion profile in accordance with the jog operation and position movement command are as follows.

Parameter Type	Jog Operation	Position Move
Start Speed	Pn#B106h	Pn#B101h
Acceleration time	Pn#B107h	Pn#B102h
Deceleration time		Pn#B103h
Target Speed	Command Value	Command Value
Target Position	Move to Limit point	Command Value
Velocity Override	Pn#B104h	

Attention

The starting speed of a typical motion profile starts at 1 [pps]. The picture of the motion profile expressed in the explanation is expressed with relatively high start speed for easy understanding.

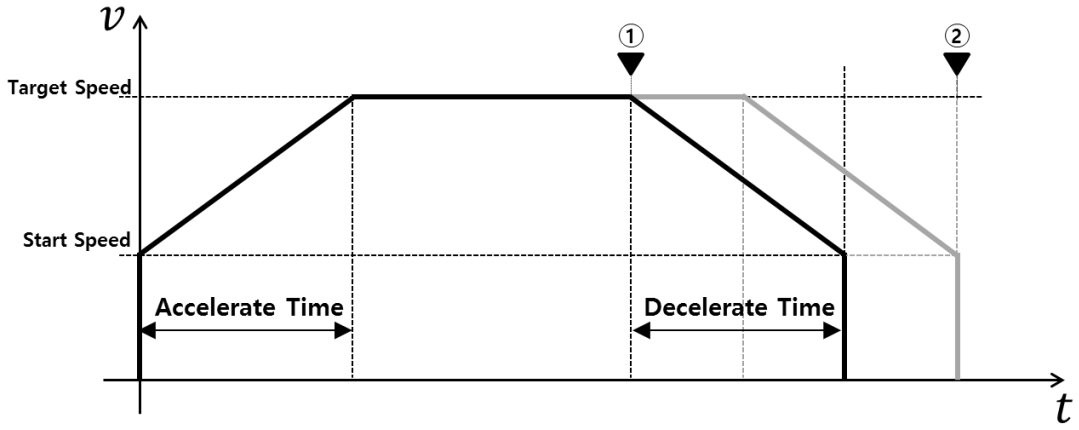
The elements of the motion profile of the motion applied during PT operation operate with the values entered in the PT item.

7.1 Operation of Stop Command

Stop commands include S-STOP and E-STOP commands. S-STOP is a command that stops with deceleration information, and E-STOP command is a command that stops immediately without deceleration information.

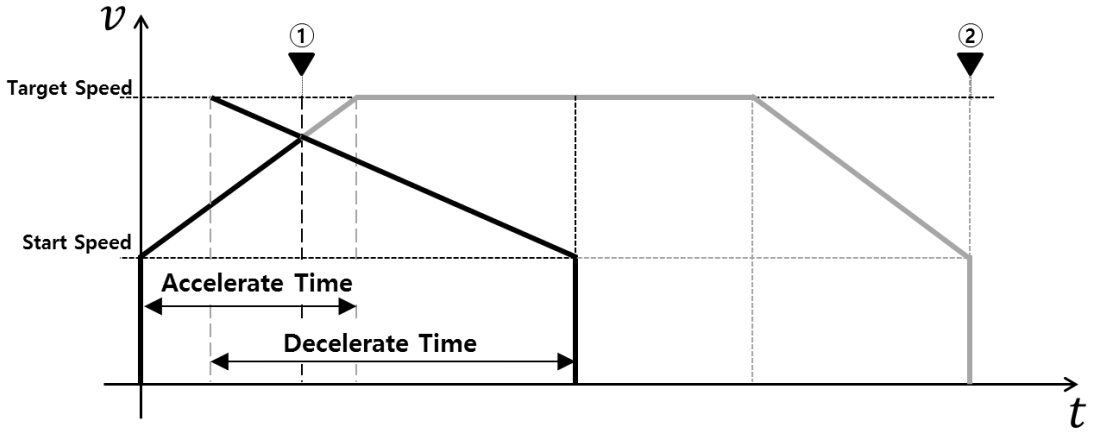
7.1.1 Operation of S-STOP during constant speed operation

The S-STOP command stops at the motion profile deceleration information when the S-STOP instruction is executed at the point of ① before reaching ② in the motion profile started to reach ② position.



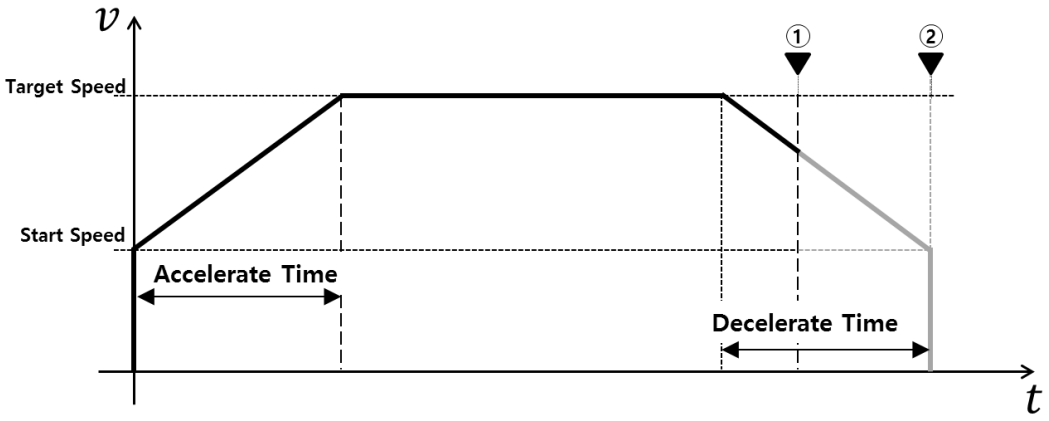
7.1.2 Operation of S-STOP during Acceleration Operation

If S-STOP command is executed while motion is started and acceleration is being performed, the motion in acceleration is stopped and decelerated at the point of ①, where the stop instruction is executed as follows.



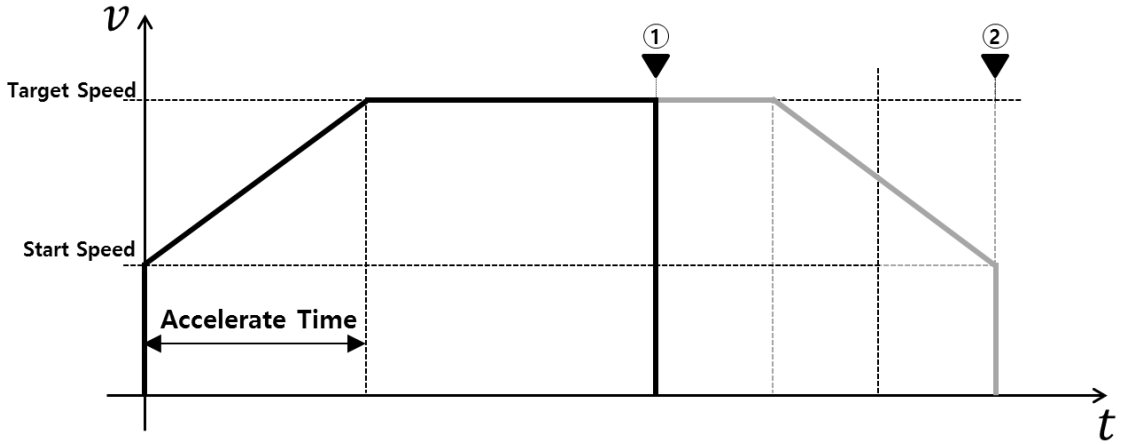
7.1.3 Operation of S-STOP during deceleration operation

When the S-STOP command is executed at the point of deceleration during motion operation, the motion is terminated at the point of ② while maintaining the deceleration state.



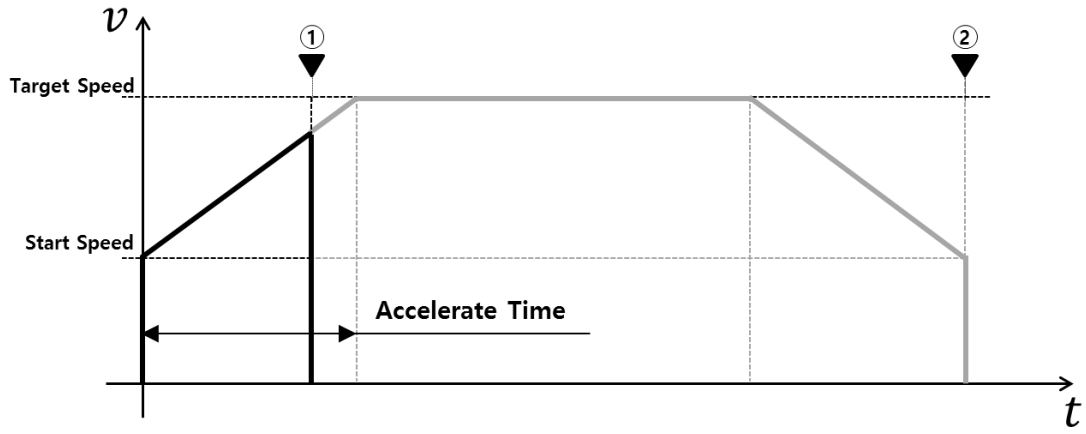
7.1.4 Operation of E-STOP during constant speed operation

The E-STOP command stops immediately when the E-STOP instruction is executed at the point of ① before reaching ② in the motion profile started to reach ② position.



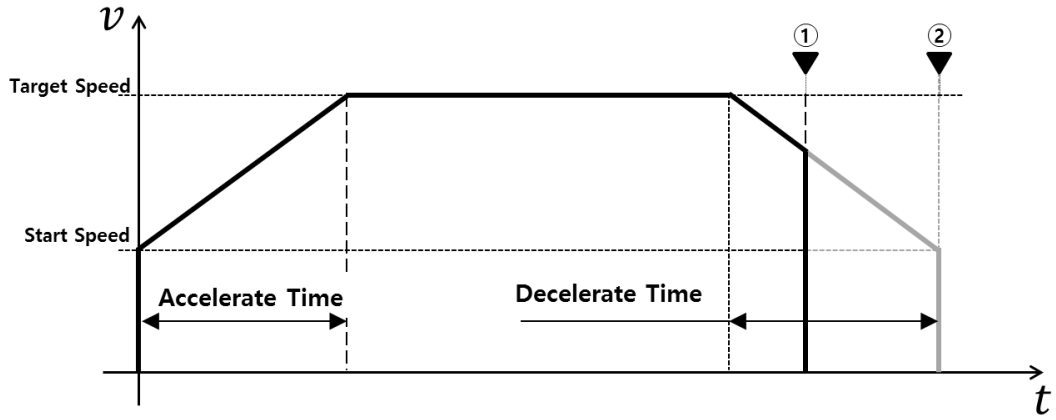
7.1.5 Operation of E-STOP during Acceleration Operation

If the E-STOP command is executed while the motion is being started and accelerated, the motion in acceleration is stopped and the motion is terminated immediately at the point of ①, when E-STOP instruction is executed as follows.



7.1.6 Operation of E-STOP during Deceleration Operation

When E-STOP command is executed at the point of deceleration during motion operation, motion is ended immediately in decelerating state.



7.2 Motion Profile of Jog Operation

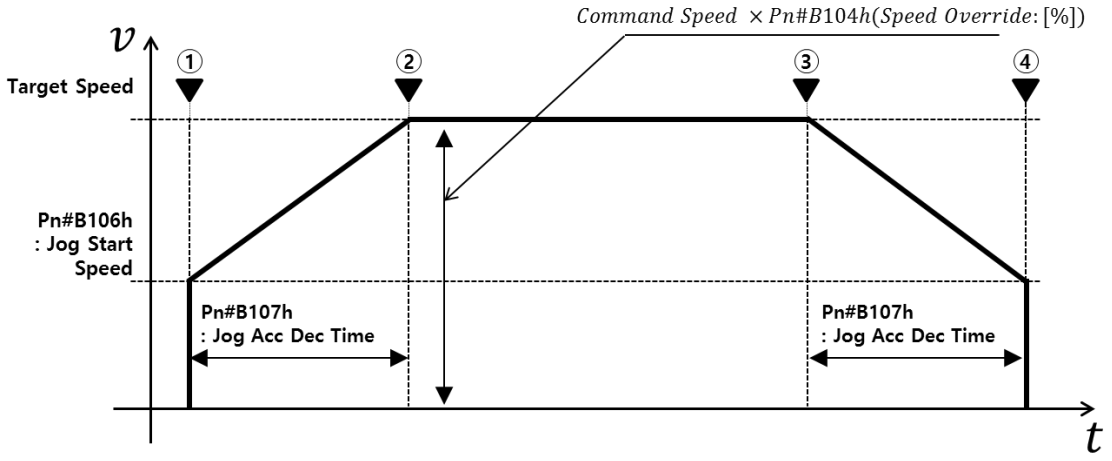
Jog operation is a command to continue operation to the limit point while the command is maintained.

7.2.1 Jog Operation Command Motion

The motion profile of jog operation calculates the motion profile with the following information at the start of command ①.

1) Start Speed : Jog Start Speed [Pn#B106h]
2) Accel / Deceleration time : Jog Acc Dec Time [Pn#B107h]
3) Target Speed : Command Speed X Speed Override[%](
4) Target Position : Command Position

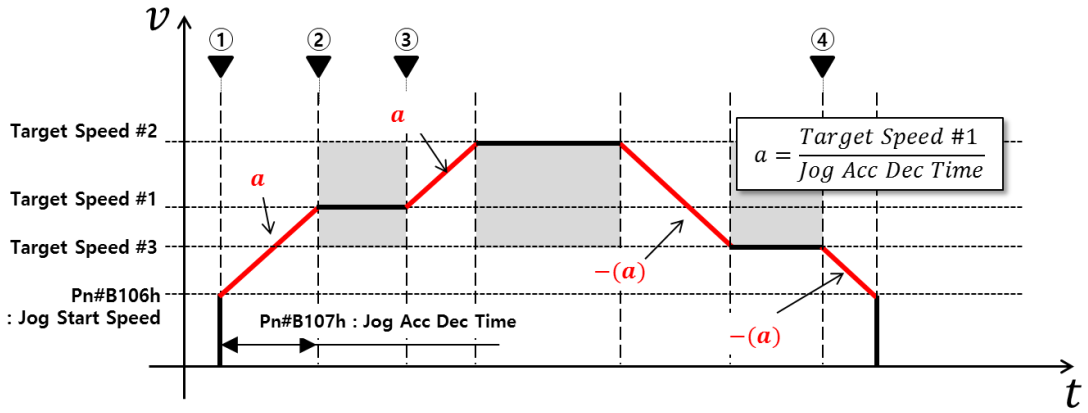
When the command is started, start the operation from the start speed to start the acceleration, and end the motion by decelerating from the point ③ at which the target position is decelerated to the start speed ④.



7.2.2 Velocity Override for Jog Operation

Jog operation continues to run the motor while the command is being maintained. At this time, in order to change the driving speed, it is possible to execute through the Velocity Override command.

The motion profile at velocity override command in jog operation is as follows.



Jog operation started from point ① starts with information of parameter Jog Acc Dec Time [Pn # B107h] and executes constant speed operation from point ② to target speed #1.

Then, the speed is changed to the newly entered target speed #2 at the time of the execution of the override command to increase the jog speed. At this time, the acceleration information whose speed changes is accelerated to the acceleration information '**a**' started at the point ① and reaches the target speed #2. Also, in the command for decelerating the speed, it is decelerated to the negative value of the acceleration information '**a**' started at the point ①.

Attention	When the Velocity override command is executed, it must be executed when the motion state is constant. If Velocity override is executing when acceleration or deceleration is being executed, the shape of the motion profile can be changed.

7.3 Motion Profile of Position Movement

The motion profile of the position move command is applied in step move, zero move, absolute move, relative move command.

The step movement operates using the motion profile acting as the incremental position movement, and the zero movement command operates using the motion profile of the absolute position movement command

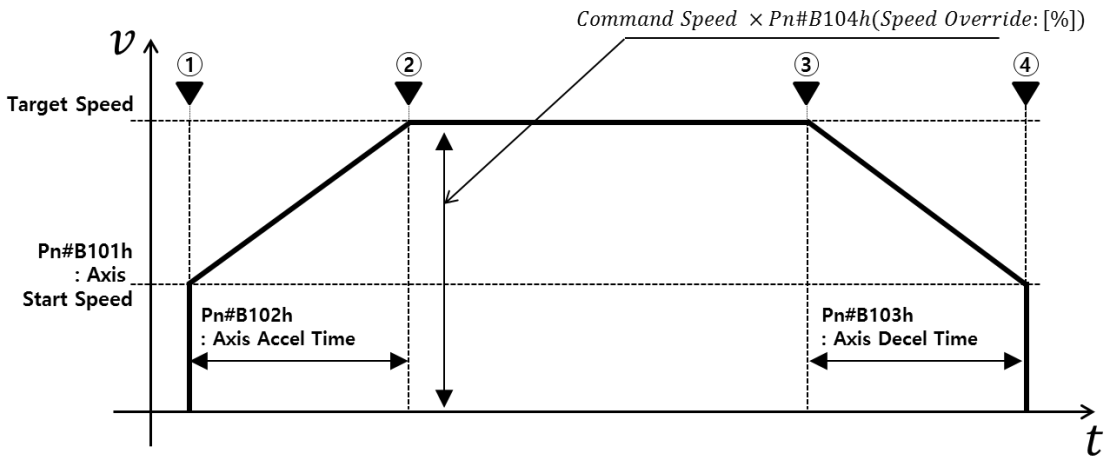
In fixed time move mode, the input value is based on the position and arrival time information, but the quotient calculated by the given parameter becomes the speed information.

7.3.1 Motion of Position Move Command

The motion profile of the move command calculates the motion profile with the following information at the start of command ①.

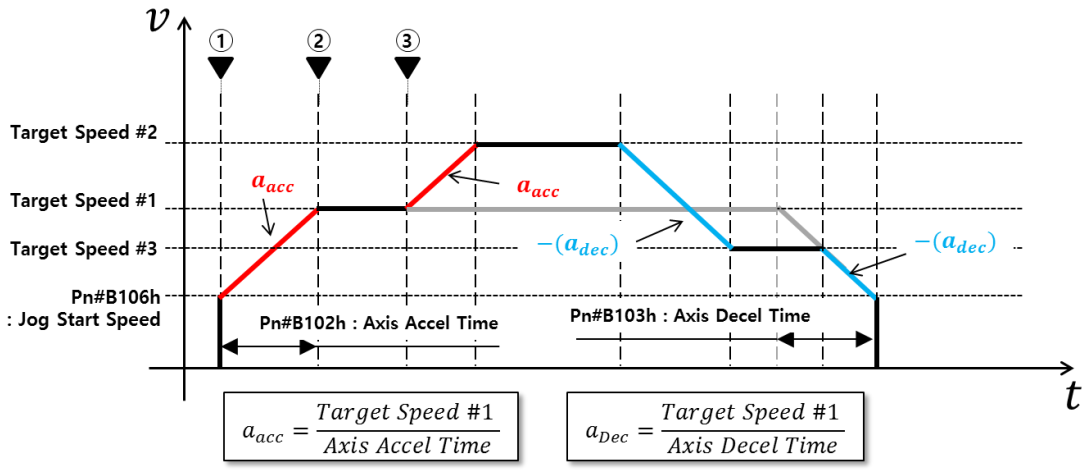
1) Start Speed : Axis Start Speed [Pn#B101h]
2) Acceleration time : Axis Accel Time [Pn#B102h]
3) Deceleration time : Axis Decel Time [Pn#B103h]
4) Target Speed : Command Speed X Speed Override[%]
5) Target Position : Command Position

When the command is started, start the operation from the start speed to start the acceleration, and end the motion by decelerating from the point ③ at which the target position is decelerated to the start speed ④.



7.3.2 Velocity Override of Position Move

The Velocity override of position move is a command to change the moving speed in the position moving state. The motion profile at speed override command during position move is as follows.



The position move motion started from the point ① starts with the information of Parameter Axis Accel Time [Pn # B102h] and executes the constant speed operation from the point ② to the target speed # 1. The speed is changed to the newly entered target speed # 2 at the time of the execution of the override command to increase the position move speed. At this time, the acceleration information for changing the speed is accelerated to the acceleration information '**aacc**' started at the point ① and reaches the target speed #1.

Also, in the command to decrease the speed, the deceleration information '$\mathbf{a_{dec}}$' used in the motion profile started at the point ① is decelerated.

Attention	When the Velocity override command is executed, it must be executed when the motion state is constant. If velocity override is executing when acceleration or deceleration is being executed, the shape of the motion profile can be change.

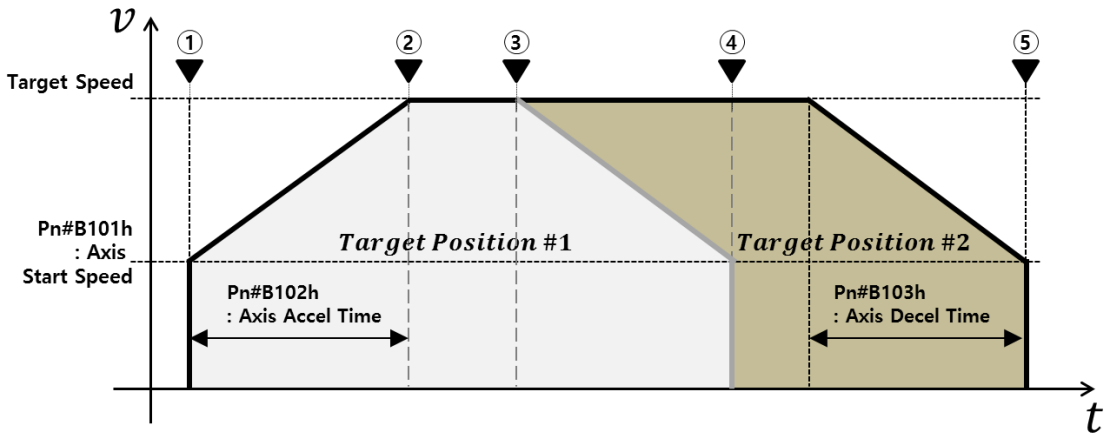
7.3.3 Absolute Position Override

Absolute Position Override is a command to change the target position during absolute position move. The point where the absolute position override command is valid when the position movement is executed with the motion profile started first and is running at constant speed after acceleration.

Attention	When the position override command is executed, it must be executed when the motion state is constant. If the position override is executed while accelerating or decelerating, the shape of the motion profile can be changed.

1) Change the position to a value larger than the current position

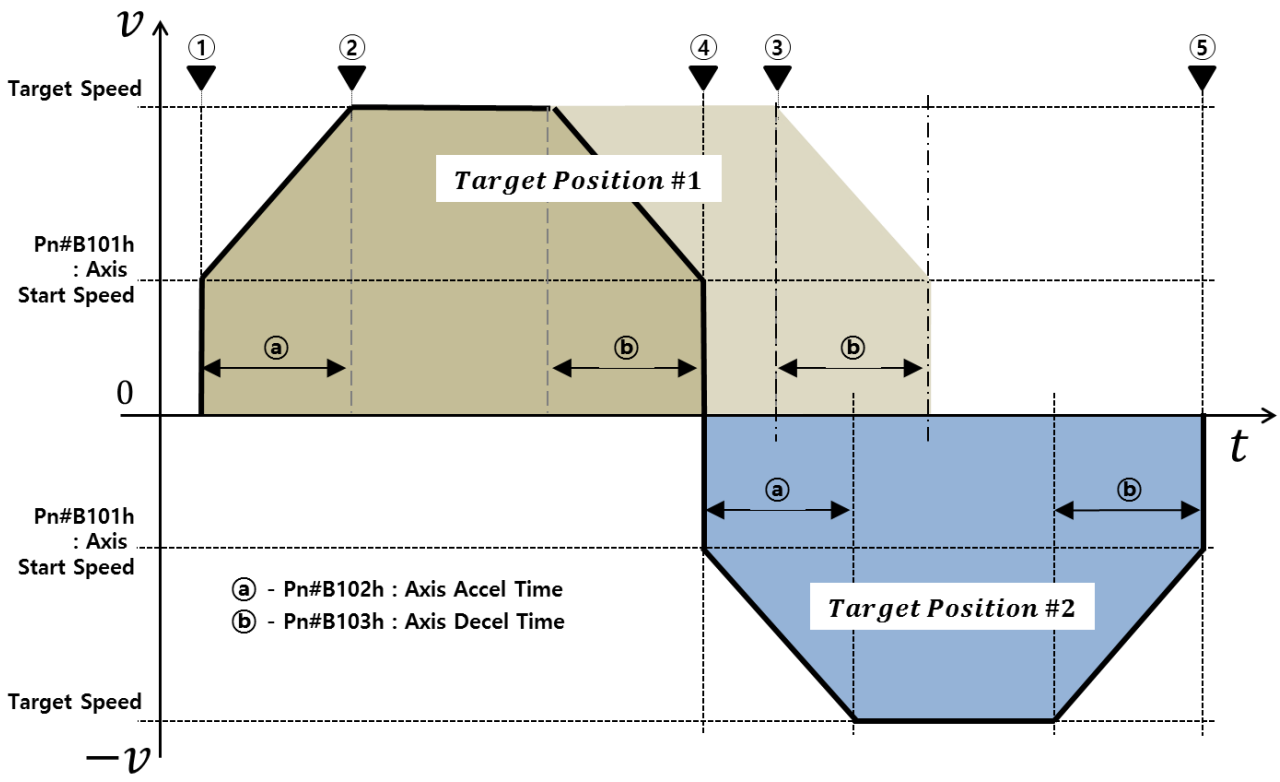
When the absolute position override command is executed between points 2 and 3 and set to a value larger than the current operating position, motion ends at ⑤ reaching target position # 2, not ④ reaching target position # 1.



1) Change the position to a value smaller than the current position value

When the absolute position override command is executed between the time point ② and ③ while the motion profile moving to the target position # 1 started at the time point 1 is being executed, the movement is made to the target position # 1 when the new position # 2 is smaller than the current position Motion will be decelerated and stopped. Move from the stop point ④ to the new target position # 2 by executing motion profile.

The motion based on this condition is executed with the motion profile moving to the target position # 2 by maintained the information of the acceleration time, deceleration time, and target speed of the profile moving to the target position # 1 started at the point ①.



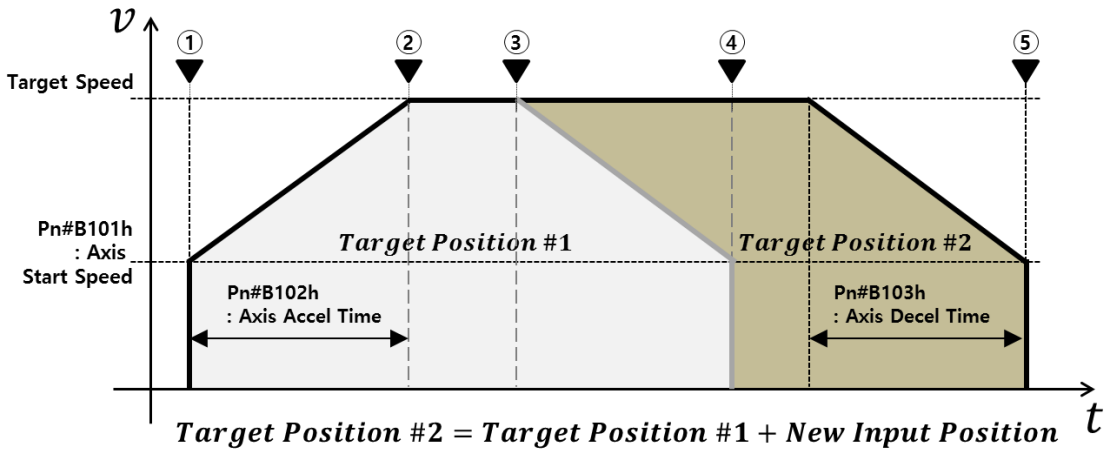
7.3.4 Incremental Position Override

Incremental Position Override is a command to change the target position during incremental position move. The point where the incremental position override command is valid when the position move to the first started motion profile has been completed and is running at constant speed.

Attention	When the position override command is executed, it must be executed when the motion state is constant. If the position override is executed while accelerating or decelerating, the shape of the motion profile can be changed.

1) Change the position to a value larger than the current position

When the incremental position override command is executed between the point ② and ③, the profile is created when the sum of the target position #1 and the input override position value is larger than the target position being operated.

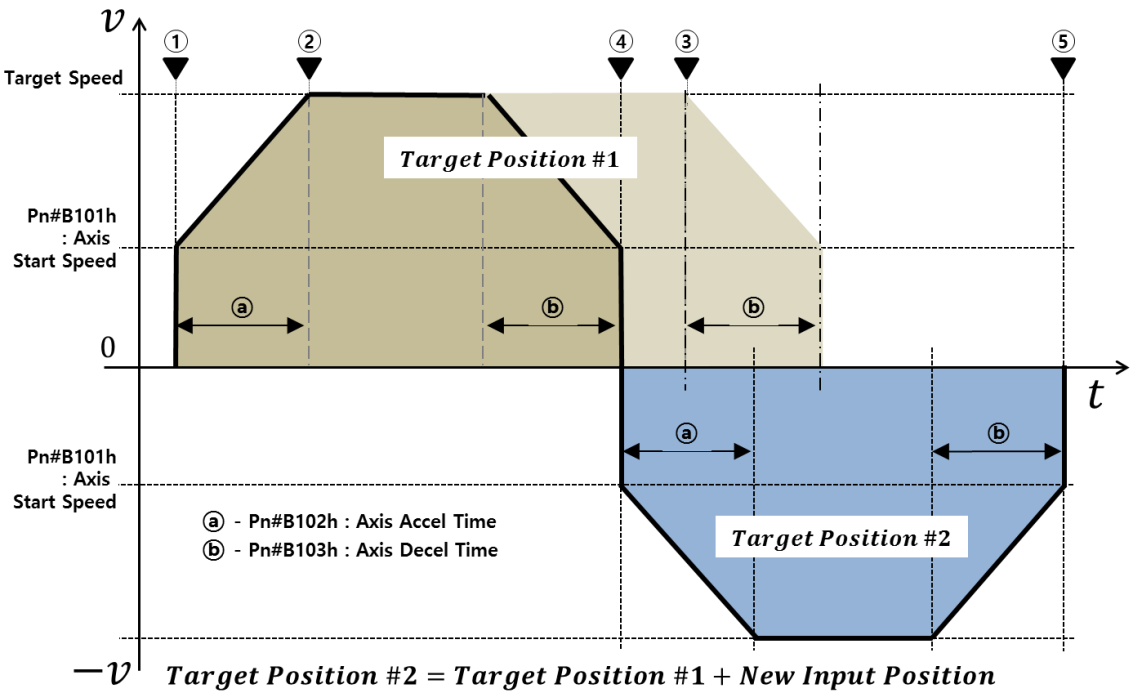


1) Change the position to a value smaller than the current position value

When the incremental position override command is executed between the points ② and ③ and the sum of the target position # 1 and the input override position value is smaller than the target position, the motion to move to the target position # 1 is decelerated to stop.

Then, at the point ④, the motion profile reaching the target position # 2 is generated as follows and moves to the target position # 2 after acceleration in the opposite direction.

The motion based on this condition is executed with the motion profile moving to the target position #2 by keeping the information of the acceleration time, deceleration time, and target speed of the profile moving to the target position # 1 started at the point ①.



8. Homing Profile

Homing Profile is a motion profile based on Homing Method. Homing Start Speed exists like the motion profile when moving position. In the state that the origin is searched with precise position, the home position is precisely searched by the motion without acceleration / deceleration applied as the Homing search speed.

The parameters used in the homing command are operated by the following parameters. The parameters used at this time are applied to the homing profile.

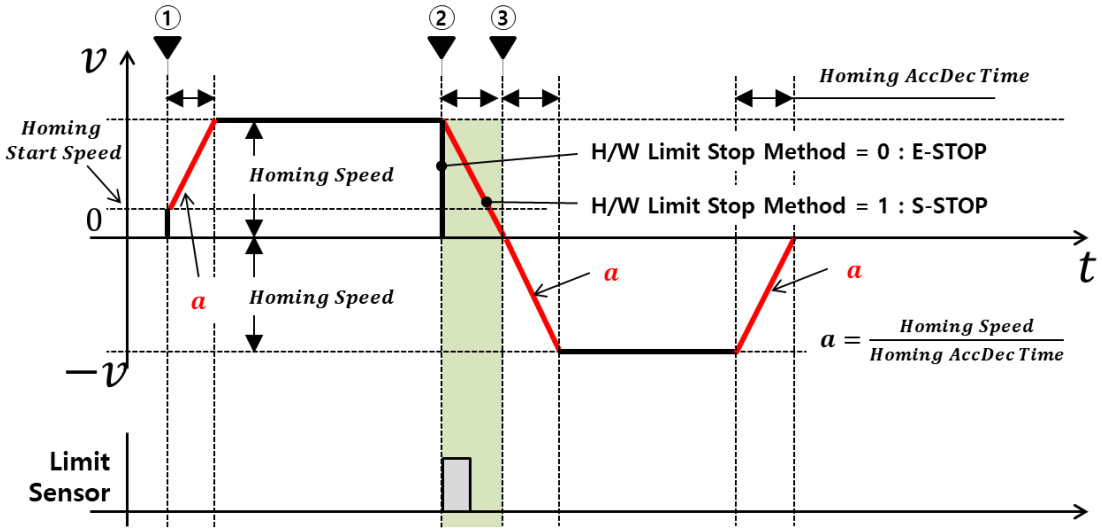
Pn#No.	Parameter Name	Description
Pn#B004h	H/W Limit Stop Method	H / W sensor input stop method
Pn#B200h	Homing Method	Setting of homing command type
Pn#B201h	Homing Speed	Speed value to the point where the origin is detected
Pn#B202h	Homing Search Speed	Speed value for redetection at the point where the origin is detected
Pn#B203h	Homing Acc Dec Time	Acc/Deceleration time during homing operation
Pn#B204h	Homing Dir	Homing direction
Pn#B205h	Homing Offset	Move value after homing
Pn#B206h	Homing Position Set	Position setting value after completion of homing
Pn#B208h	Homing Start Speed	Start Speed of Homing move.

Pn#B200h : Homing Method

Method Number.	Method Type
0x00	Homing profile of "Origin"
0x01	Homing Profile of "Z-Origin"
0x02	Homing Profile of "Limit Origin"
0x03	Homing Profile of "Z Limit Origin
0x04	Homing Profile of "Z Phase"
0x05	Set Origin

※ **When the H / W limit sensor is detected to be dirtier than the home position during homing**

When the H / W limit sensor in the movement direction is detected at homing, the homing direction is changed. Also, according to the value of Parameter H / W Limit Stop Method [Pn # B004h], emergency stop as in ② of the color area in the following figure, or deceleration stop as in ③ is executed. After that, it is moved in the opposite direction of origin to perform homing



Attention	In Origin return method, Limit Origin does not perform the homing to the point passed by the limit sensor.
Attention	If the deceleration time is long due to the value of Parameter Homing Acc Dec Time [Pn # B203h] in the process of decelerating operation by detection of H / W limit or origin sensor during homing, it may collide with the mechanism. In addition, when you release the sensor, motion will continue to search for the sensor. In this case, increase the sensing range of the sensor or set the value of Parameter Homing Acc Dec Time [Pn # B203h] to a low value so that the acceleration / deceleration time is relatively short.
Attention	If the value of Homing Start Speed [Pn # B208h] is large when executing the homing, position tracking alarm (3) or overload (4) may occur due to the inertial load of the instrument. Adjust start speed to match instrument characteristics In addition, Start Speed does not exceed this value even if it is set higher than motion speed in all motion profiles.

8.1 Homing profile of "Origin"

The Homing method by the origin sensor is the method in which the origin detected when the sensor dog is approached to the home sensor. The operation in this way is as follows.

◆ Operation of the homing profile

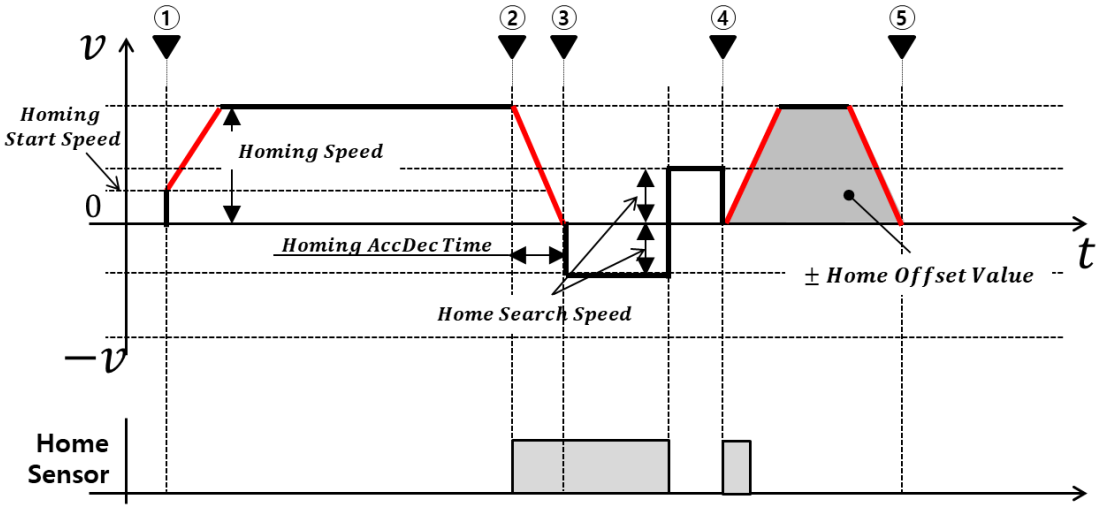
① Move until the home sensor is detected after Acceleration with Parameter Homing Acc Dec Time [Pn # B203h] and Home Search Speed [Pn # B202h]

② After detection of the sensor, deceleration to the parameter Homing Acc Dec Time [Pn # B203h]

③ Without Acceleration / Deceleration operation, it execute the operation to search the origin sensor precisely at the speed of Parameter Home Search Speed [Pn #B202h]

④ When the Z-phase signal is precisely searched, move to the value of Parameter Homing Offset [Pn # B205h] to end the homing operation

⑤ When homing is completed, set the current position to the value of Parameter Homing Position Set [Pn # B206h]



8.2 Homing Profile of "Z-Origin"

The homing method by Z phase input signal after home sensor detection is to designate the point where the Z phase input signal of the encoder is sensed as origin after executing the return method by home sensor. The operation in this way is as follows.

◆ Operation of Homing profile

① Move until the home sensor is detected after Acceleration with Parameter Homing Acc Dec Time [Pn # B203h] and Home Search Speed [Pn # B202h]

② After detection of the sensor, deceleration to the parameter Homing Acc Dec Time [Pn # B203h]

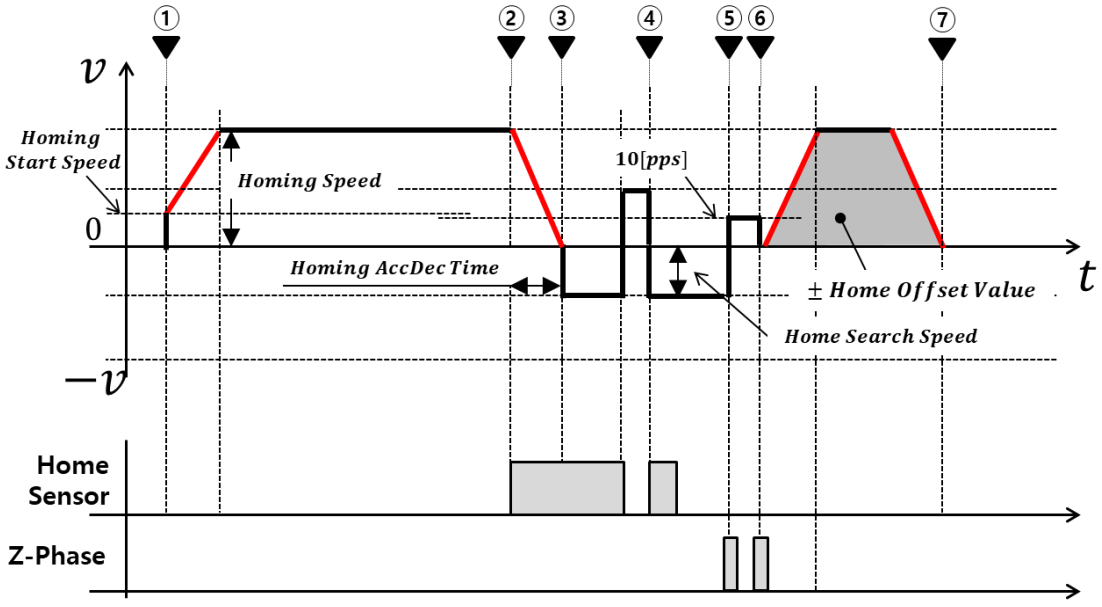
③ Without Acceleration / Deceleration operation, it execute the operation to precisely detect the origin sensor at the speed of Parameter Home Search Speed [Pn # B202h].

④ When the sensor has been precisely searched, proceed to detect the Z phase signal at the speed of Parameter Home Search Speed [Pn # B202h]

⑤ When a Z-phase signal is detected, a precision sensing operation is executed. If the Z phase is get out due to speed of the parameter Home Search Speed [Pn # B202h] is high, additionally execute the precise detection of the Z phase at 10 [pps]

⑥ When the Z-phase signal is precisely searched, move to the value of Parameter Homing Offset [Pn # B205h] to end the homing operation

⑦ When homing is completed, set the current position to the value of Parameter Homing Position Set [Pn # B206h]



8.3 Homing Profile of "Limit Origin"

The homing method based on the limit input signal specifies the position where the limit sensor is detected as the home position. The operation in this way is as follows.

◆ Operation of Homing profile

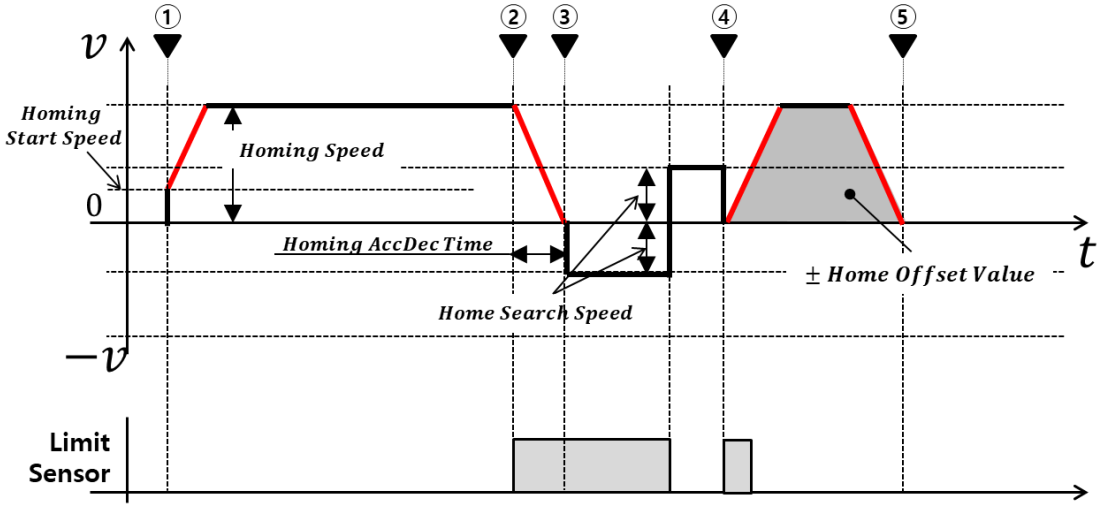
① Move until the home sensor is detected after Acceleration with Parameter Homing Acc Dec Time [Pn # B203h] and Home Search Speed [Pn # B202h]

② After detection of the sensor, deceleration to the parameter Homing Acc Dec Time[Pn # B203h]

③ Without acceleration / deceleration operation it executes the operation to preciselydetect H / W limit sensor at the speed of Parameter Home Search Speed [Pn # B202h]

④ When the Z-phase signal is precisely searched, move to the value of Parameter Homing Offset [Pn # B205h] to end the homing operation

⑤ When homing is completed, set the current position to the value of Parameter Homing Position Set [Pn # B206h]



8.4 Homing Profile of “Z Limit Origin

The "Z Limit Origin" method uses the position where the Z phase input signal of the encoder is detected as the origin after Homing by the limit input signal. The operation in this way is as follows.

◆ Operation of Homing profile

① Move until the home sensor is detected after Acceleration with Parameter Homing Acc Dec Time [Pn # B203h] and Home Search Speed [Pn # B202h]

② After detection of the sensor, deceleration to the parameter Homing Acc Dec Time [Pn # B203h]

③ Without acceleration / deceleration operation it executes the operation to precisely detect H / W limit sensor at the speed of Parameter Home Search Speed [Pn # B202h]

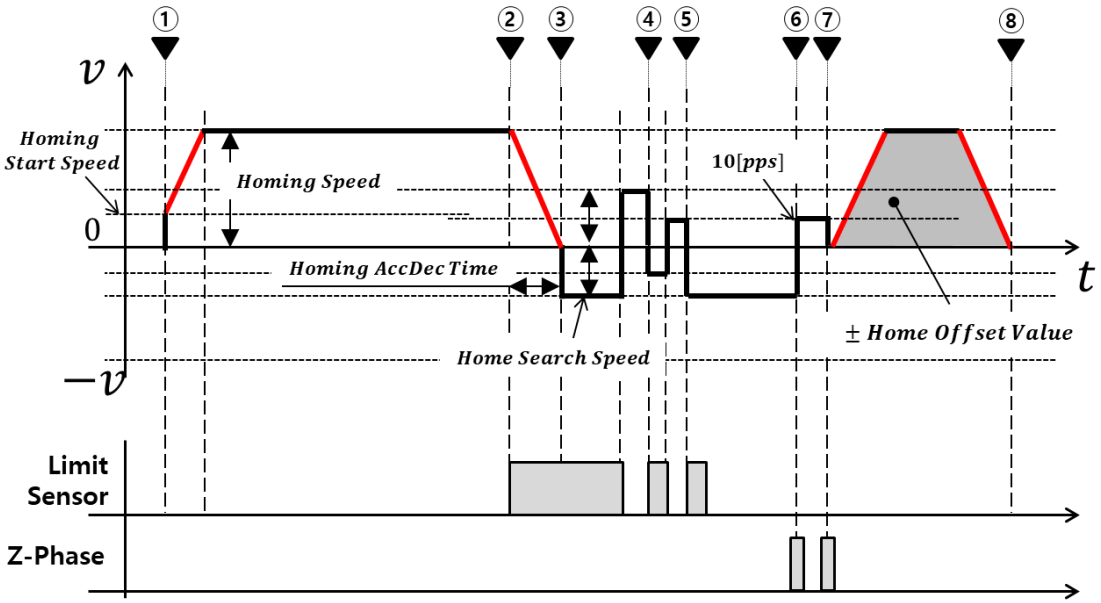
④ When the sensor has been precisely searched, it will detect Z phase signal near H / W limit sensor at 10 [pps]

⑤ If the Z phase signal is not detected near the H / W limit, it execute the operation to detect the Z phase signal at the speed of Parameter Home Search Speed [Pn # B202h]

⑥ When a Z-phase signal is detected, a precision sensing operation is executed. If the Z phase is get out due to speed of the parameter Home Search Speed [Pn # B202h] is high, additionally execute the precise detection of the Z phase at 10 [pps]

⑦ When the Z-phase signal is precisely searched, move to the value of Parameter Homing Offset [Pn # B205h] to end the homing operation

⑧ When homing is completed, set the current position to the value of Parameter Homing Position Set [Pn # B206h]


①
②
③
④
⑤
⑥
⑦
⑧
v
Homing
Start Speed
Homing Speed
0
10[pps]
t
Homing AccDec Time
± Home Offset Value
Home Search Speed
−v
Limit
Sensor
Z-Phase

8.5 Homing Profile of "Z Phase"

The Homing method by Z-phase input is to set Z-phase signal as origin point which is detected once by 1 [pulse] per rotation of encoder. The operation in this way is as follows.

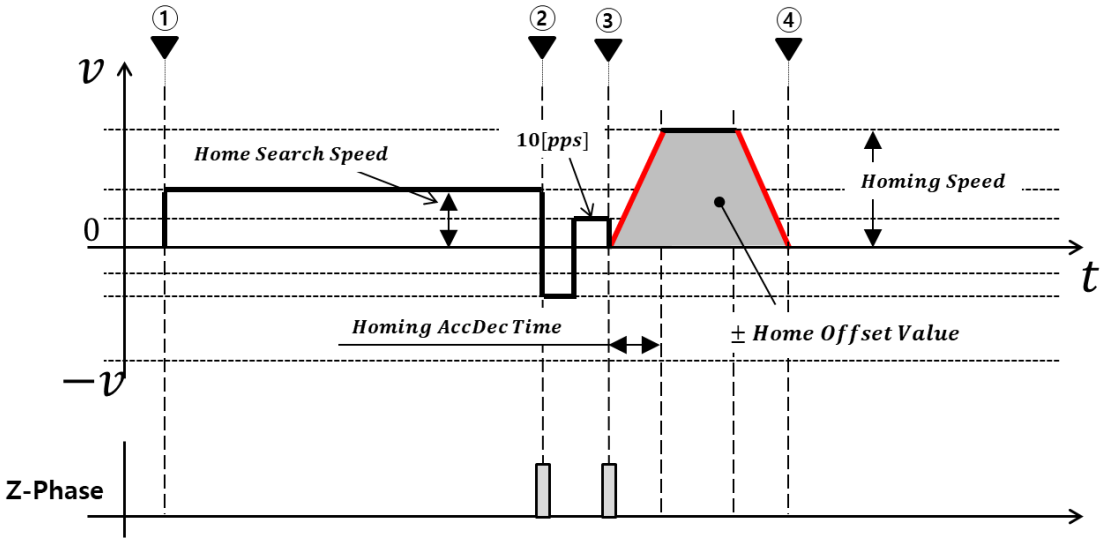
◆ Operation of Homing profile

① Without acceleration / deceleration operation, it execute operation to detect the Z phase signal at the speed of Parameter Home Search Speed [Pn # B202h]

② When the Z phase signal is detected, the operation for precise detection of Z phase is executed at 10 [pps]

③ When the Z-phase signal is precisely searched, move to the value of Parameter Homing Offset [Pn # B205h] to end the homing operation

④ When homing is completed, set the current position to the value of Parameter Homing Position Set [Pn # B206h]



9. Protection Function

9.1 Types of Alarm

If an alarm occurs during drive operation, one of the status LEDs flashes red and the protection function can be checked according to the number of flashes.

Flash count	Alarm Name	Description
1	Over Current Error	The current through power devices in inverter exceeds the limit value *1
2	Over Speed Error	Motor speed excess 3300[rpm]
3	Step Out Error	If the motor does not follow the pulse input normally
5	Over Temperature Error	Temperature of inside of the drive exceed 85°C
6	Over Regenerative voltage Error	Back EMF of motor exceeds limit value *2
7	Motor Connect Error	When there is a problem with the connection between the drive and the motor
12	ROM Error	When error occurs in parameter storage device(ROM)

*1) Detection Current : 4.5A (For Ezi-STEPII CC-Link)

*2) Limit Value : 70V

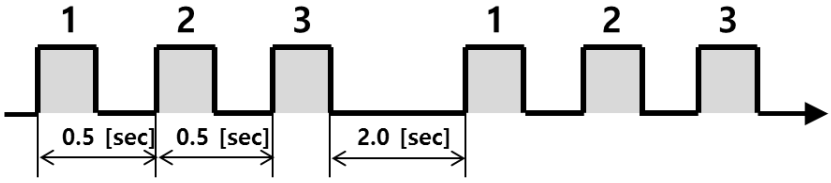
9.2 Acquiring of alarm information

If an alarm occurs, the motor will go into Servo OFF state and will stop if it is running. At the same time, the control output alarm is output and the alarm number is displayed in "7-Segment for station number(Station No) Display"

9.2.1 Checking the Drive LED

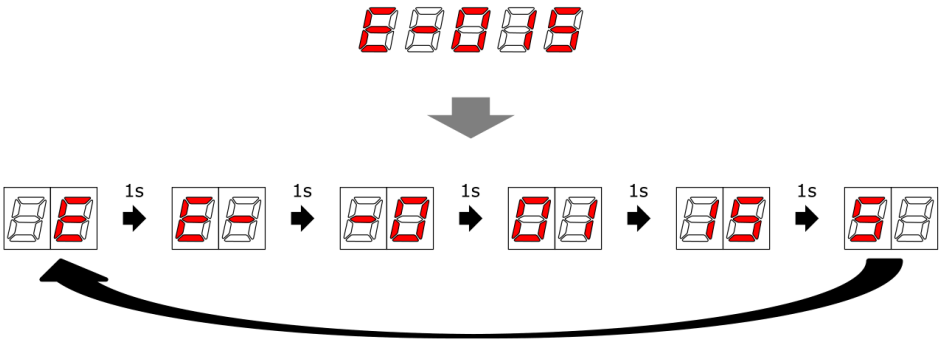
Depending on the type of alarm that is currently occurring, the ALM LED on the drive blinks at the rate of 0.5 second intervals, waits for 2 seconds, and then repeats until the alarm is released by the "Alarm Reset" command or signal.

ex) Alarm 3 : Alarm Blink output signal when occurring position tracking error



9.2.2 Checking the Segment information

When an error occurs in the controller of the drive (Fault status), the Error value is displayed in the 7-Segment instead of the CC-Link station number. The Error value is displayed in the form of 'E-000' every 3 characters in 7-Segment. Characters are switched every one second.



9.2.3 Checking the CC-Link remote

The alarm code of Ezi-STEPII CC-Link can be confirmed by 2 digit number and it can be checked by remote register at any time.

RWw	Upper 1byte	Lower 1Byte
RWw3	Warning Code	Alarm Code

9.3 Alarm check and Release

If an alarm occurs, remove the cause of the alarm and then release the alarm. Here's how to disable it. Alarms whose [Reset] is set to "Invalid" can be released only by turning off the power.

Flash count & alarm code		Alarm Name	Description	Reset
[dec]	[hex]			
1	0x01	Over current	1)Check the motor's short-circuit (A, /A, B, /B) 2)Check the mechanical status such as parameter setting.	Valid
2	0x02	Over speed	1)Check parameter setting, and abnormal operation of the motor. 2)Check the speed command of upper controller(ex:PLC).	Valid
3	0x03	Step out	1)Get down the load or increase the acceleration or deceleration speed. 2)Check assemble status of mechanism. 3)Check the brake signal cable. 4)Check the motor's short-circuit (A, /A, B, /B)	Valid
5	0x05	Overheat	1)Get down the ambient temperature or install a cooling fan. 2)Check the distance is over 50mm between drivers.	Valid
6	0x06	Over regenerative voltage	1)In case of high-speed operation, check if the acceleration or deceleration speed is low	Valid
7	0x07	Motor connection	1)Check the connection status of drive and motor.	Invalid
9	0x09	Motor voltage error	1)Check if power is supplied to the drive. 2)Check the diameter and length of power cable to driver	Invalid
12	0x0C	ROM error	1)Contact to distributor.	Invalid

9.4 Warning Code

Ezi-STEPII CC-Link has messages about processing and operation status of commands. In the remote reception register RWw3, the warning code is displayed for the upper 1 byte, and the alarm code is displayed for the lower 1 byte.

Ex 1) 0x2003 : User try to execute the Servo On command A position tracking error alarm has occurred
Ex 2) 0x1203 : Execute motion command in alarm occurrence state
Ex 3) 0x1300 : No alarm, but execute motion command in Servo Off state

Code	Description of Message
0x0000	Clear State
0x0001	Over current error
0x0002	Over speed error
0x0003	Position tracking error
0x0005	Temperature error
0x0006	Regenerative voltage error
0x0007	Motor connect error
0x0009	Motor voltage error
0x000E	ROM error
0x0032	Drive internal communication error
0x0064	ROM initialization error
0x006E	ROM reading error
0x0079	ROM writing error
0x0100	Motion command duplication, unchecked motion command is executed (simultaneous motion input execution)
0x0200	Data range is out of range, does not fit data input range of command
0x0400	Teaching failure, Teaching command failure
0x1000	Motion command failure, execution of a new operation while the current motor is in operation Command instruction
0x1100	Execute a new operation while the stop command is executed.
0x1200	Motion command is executed during alarm occurrence
0x1300	Run command is executed in Servo OFF state
0x1400	Execute operation command while E-STOP instruction is executed
0x1500	Motion command is executed when a motion command is assigned to the input signal,
0x1600	Attempt to execute motion command in HOLD state
0x1700	Execute motion command in setting mode
0x1800	+ direction move command is executed when H/W limit + is detected
0x1900	- direction move command is executed when H/W limit - is detected

Code	Description of Message
0x1A00	Move command ids executed while both H/W limit are detected
0x1B00	S/W Limit + is detected
0x1C00	S / W Limit – is detected
0x1D00	Both S/W Limit are detected
0x1E00	Override command failure.
0x1F00	The command is failed.
0x2000	Servo On failure, Execute Servo On command during alarm occurrence
0x2100	Execute Servo On while E-STOP command executed
0x2300	Servo ON command is executed when Servo Off is selected as the input signal.
0x2400	A command is assigned to the input signal.
0x3000	PT operation failure, PT operation not possible
0x3100	No PT Data
0x3200	The PT number is shifted out of the assigned position.
0x7100	CC-Link ID switch change error
0x7200	CC-Link Mode switch change error
0x7500	CC-Link communication error, connection with master is released
0x8000	Parameter setting error
0x8100	Access to unchangeable parameters in Servo On state
0x8200	Does not fit within the range of the value range of the parameter
0x8300	Select wrong parameter address
0xC000	Not existed CMD code

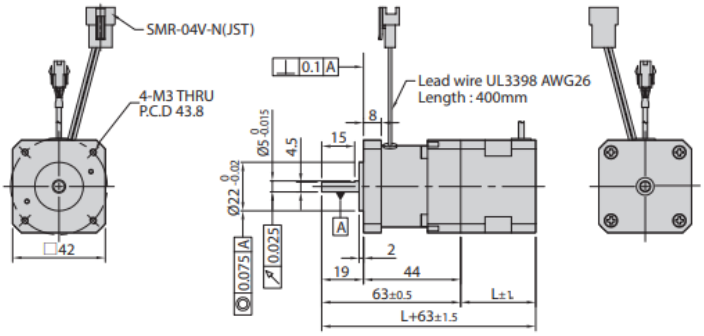
10. Appendix

10.1 Brake Mounted Motors

10.1.1 Specifications

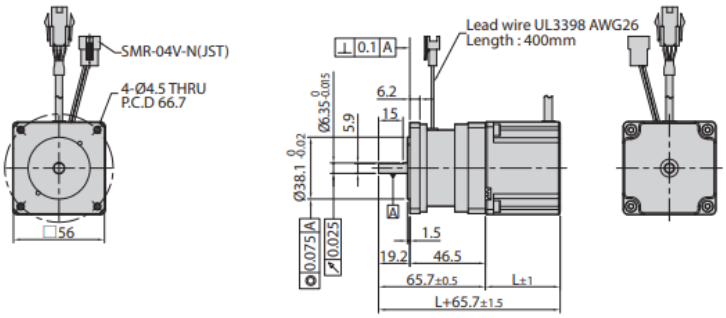
Unit Name	Motor Name	Electronic Brake						Permissible Radial Load [N]				Permissible Axial Load [N]
		Type	Voltage Input [V]	Rated Current [A]	Power Consumption [W]	Static Friction Torque [N·m]	Motor Unit Weight [g]	Distance from End of Shaft [mm]				
								3	8	13	18	
Ezi-STEPⅡ-42S-BK	BM-42S-BK	Non-excitation run type	24 [VDC] ±10%	0.2 [A] ±10%	5	0.2	510	22	26	33	46	Must be lower than Unit's Weight
Ezi-STEPⅡ-42M-BK	BM-42M-BK						570					
Ezi-STEPⅡ-42L-BK	BM-42L-BK						640					
Ezi-STEPⅡ-42XL-BK	BM-42XL-BK						770					
Ezi-STEPⅡ-56S-BK	BM-56S-BK			0.27[A] ±10%	6.6	0.7	870	52	65	85	123	
Ezi-STEPⅡ-56M-BK	BM-56M-BK						1,190					
Ezi-STEPⅡ-56L-BK	BM-56L-BK						1,380					
Ezi-STEPⅡ-60S-BK	BM-60S-BK				7.5	0.7	1,150	70	87	114	165	
Ezi-STEPⅡ-60M-BK	BM-60M-BK						1,350					
Ezi-STEPⅡ-60L-BK	BM-60L-BK						1,960					

10.1.2 Motor Size



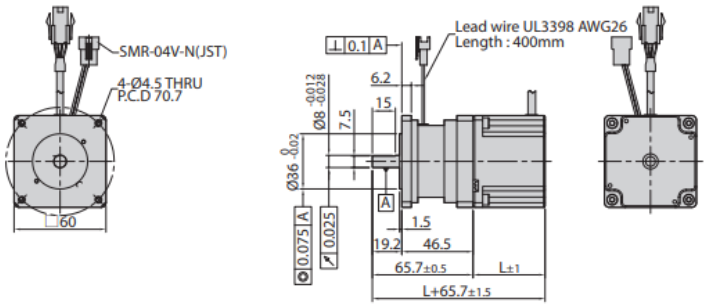
42mm

Model Name	Length(L)	Weight(kg)
BM-42S	34	0.44
BM-42M	40	0.51
BM-42L	48	0.58
BM-42XL	60	0.70



56mm

Model Name	Length(L)	Weight(kg)
BM-56S	46	0.97
BM-56M	55	1.13
BM-56L	80	1.55



60mm

Model Name	Length(L)	Weight(kg)
BM-60S	47	1.08
BM-60M	56	1.28
BM-60L	85	1.88

FASTECH

Fast, Accurate, Smooth Motion

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