Ezi-MotionGate

PROFIBUS-DPV1
PLC Example (MELSEC-Q)

FASTECH

Fast, Accurate, Smooth Motion Control

Manual Version : ver 1.01.10(rev.4)

Application Plus-R Firmware version : 6.0.0.00 & more

First edition : Dec. 15, 2011

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www.fastech.co.kr

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Example Table of Contents

※ Before Using ※

- Thank you for purchasing FASTECH Ezi-MOTIONGATE.
- Ezi-MOTIONGATE is a Fieldbus to FASTECH protocol Gateway Unit with a 32bit high performance ARM processor.
- This User's Manual contains handling procedures for Ezi-MOTIONGATE, safety instructions, error diagnosis and suggestions, specifications, etc.
- Read and understand this User's Manual to use Ezi-MOTIONGATE safely.
- After reading this User's Manual, please store it for those who use this product so that they can reference this manual at any time.

1. Safety Instructions

◆ General Information

- The User's Manual shall be subject to change in accordance with improvement in the product, change in specifications, or to make the User's Manual easier to understand.
- To order a new User's Manual due to damage or loss, contact the agent you purchased your product at or contact us.
- If the user modifies the products arbitrarily, it shall not be covered under our warranty and we will not be held responsible.

◆ Safety Instructions

- Before installation, operation, inspection, repair, etc, be sure to read the User's Manual thoroughly. In addition, be aware of the safety precaution notices for the machine sufficiently before using the product.
- The User's Manual classifies the level of safety instructions into **Caution** or **Warning**.

⚠CAUTION :	If handled incorrectly, dangerous situations that may lead to serious injuries or property damage may occur
⚠WARNING :	If handled incorrectly, dangerous situations such as electric shock may occur and there may be a risk of death or severe injury.

- Be sure to follow these precautionary notices as failure to do so may cause critical results, depending on the situation.

◆ Product Status

⚠CAUTION	Check if the product is damaged or if parts are missing. If defective products are installed or operated, there may be damage to the machine or a risk of injury.

◆ Installation

⚠CAUTION	Pay sufficient attention during operation. If dropped, the product may be broken or, if dropped on the foot, there may be a risk of injury. Keep away from flammable materials when handling the product as there is a risk of fire. When installing several Ezi-MOTIONGATE in one closed space, be sure to install a cooling device, etc so that the ambient temperature is less than 50℃. Overheating may cause fire and other accidents.
⚠WARNING	The installation, connection, operation, modification, inspection and diagnosis of malfunction shall be carried out by qualified personnel. If not, there is a risk of fire, injury, device breakage, etc.

◆ Wiring

⚠CAUTION	For the drive's power input voltage, be sure to comply with the rated range. Failure to comply may cause fire and power and/or mechanical failure. The connection should be carried out according to the wiring diagram. Failure to do so may cause fire or malfunction.
⚠WARNING	Check if input power is OFF before operating as there is a risk of electric shock or fire. As this Ezi-MOTIONGATE case is insulated with GND of internal circuit by the condenser, be sure to ground the device as there is a risk of electric shock, fire, or product malfunction.

◆ Operation and Setting Change

⚠CAUTION	If the protective function of the drive runs, locate and fix the problem, then release the protective function. If operation continues without fixing the problem, the motor or drive will malfunction, causing injury or device breakage. When supplying power to the drive, the control input of the drive should be OFF. If not, the motor will run, causing injury or damage to the device. All values of this Ezi-MOTIONGATE were set correctly at the time of its release. Before adjusting settings, read the User's Manual thoroughly. Improper usage may break or damage the machine.

◆ Maintenance & checking

⚠WARNING	For this Ezi-MOTIONGATE, the maintenance or inspection should be carried out after shutting down the main circuit and some time has elapsed. As the power may still remain in the condenser, there may be a risk of electric shock. While supplying electricity, do not change the wiring, as there may be a risk of electric shock, product damage, or breakage of machinery. Never modify the product. Modification of the product will invalidate the warranty and make it not possible to receive after-sales service from us. There may also be a risk of electric shock, product damage or machine breakage.

Notices for Installation.

1) The products should be used indoors and the ambient temperature must be 0°~55°C.

2) If the ambient temperature is over 50°C, the heat should be discharged outside.

3) Avoid direct light, magnetic objects, and radiative objects when installing.

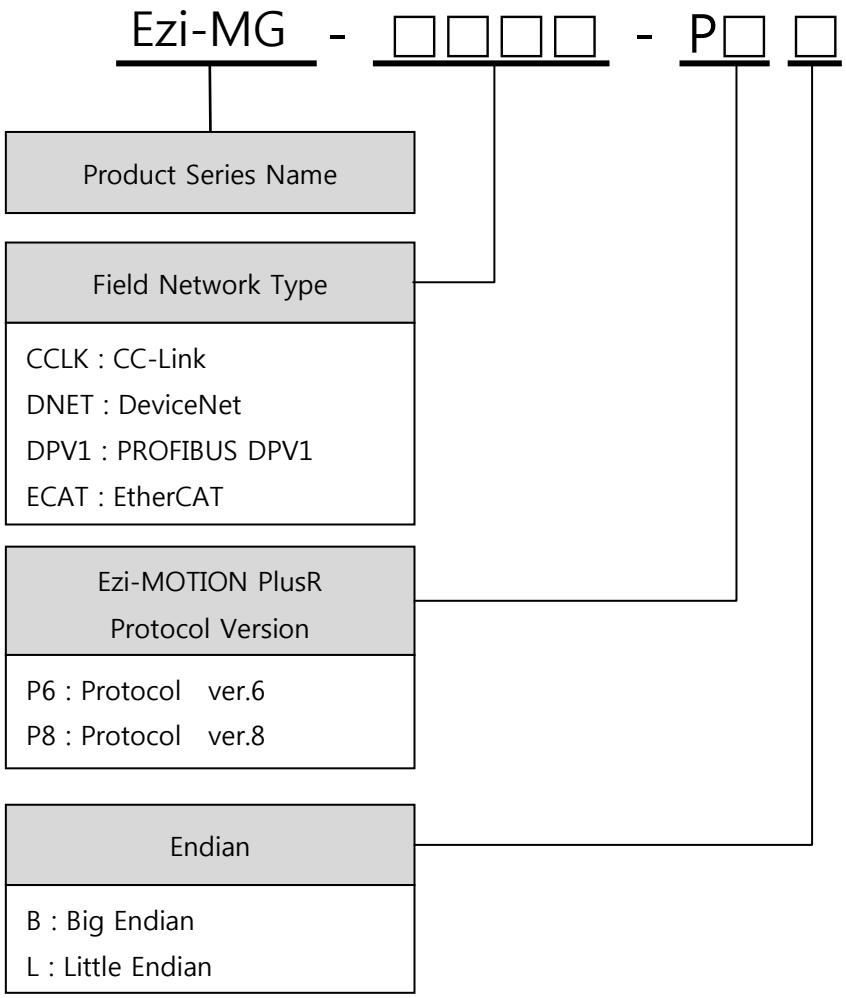
4) When installing more than two drives, leave a distance greater than 20mm vertically and greater than 50mm horizontally.

2. Specification & Dimension

2.1 Overview

- Ezi-MotionGate (hereinafter referred to as 'MOTIONGATE') is the motion Gateway device that controls the motion drive composed of FASTECH RS485 and the master, connected by the slave in the industrial network.
- Max. Quantity available for use by connecting MOTIONGATE to the slave is the quantity supported by the industrial network in use
- The motor drive (Axis) can be connected at MOTIONGATE to give a maximum of 15 motor IDs for every industrial network used

2.2 Product Name



2.3 Product Characteristic Table per Network

Network		Fieldbus
		PROFIBUS
Input voltage		24VDC ±10%
Control method		Motion gateway can control multiple axis by using the I/O data of industrial network
Multiple axis control		1 Station - 9 Axis
Consumption current		Max. 500mA
Environ.	Temp.	Use : 0~55℃ Storage : -27~70℃
	Humidity	Use : 35~85℃ (no dewing) Storage : -10~90℃(no dewing)
	Vib.Resi	0.5G
function	Switch select	Network Station No. setting, network Baud-Rate setting
	LED display	Network error, master connection error, the drive Servo ON, the drive alarm status
Special function	JOG control	4-Speed Step, Speed Ratio
	Step Move control	4-Step Distance
	Communication function	Ezi-STEP Plus-R, Ezi-SERVO Plus-R series
FASTECH RS485		

Baud-Rate (bps)	9600	19200	38400	57600	115200	230400	460800	92160
Cable length (m)	1200	1150	1100	1000	1000	880	550	300
RJ-45 connector LED	YELLOW : RS485 sending status (TX from MOTIONGATE) GREEN : RS485 receiving status (RX to MOTIONGATE)							

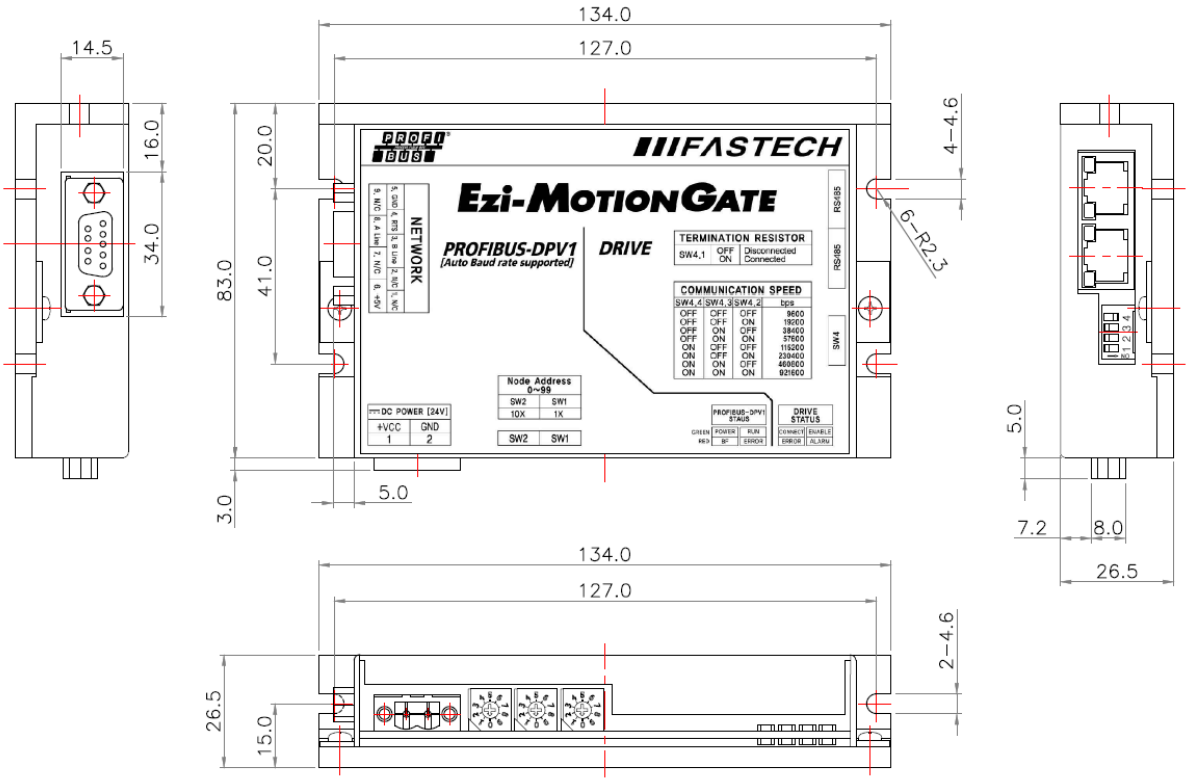
Industrial network	Communication speed and cable length according to the applied network specification

NOTE 1: The cable length is the max. connection distance when the network status is optimal.

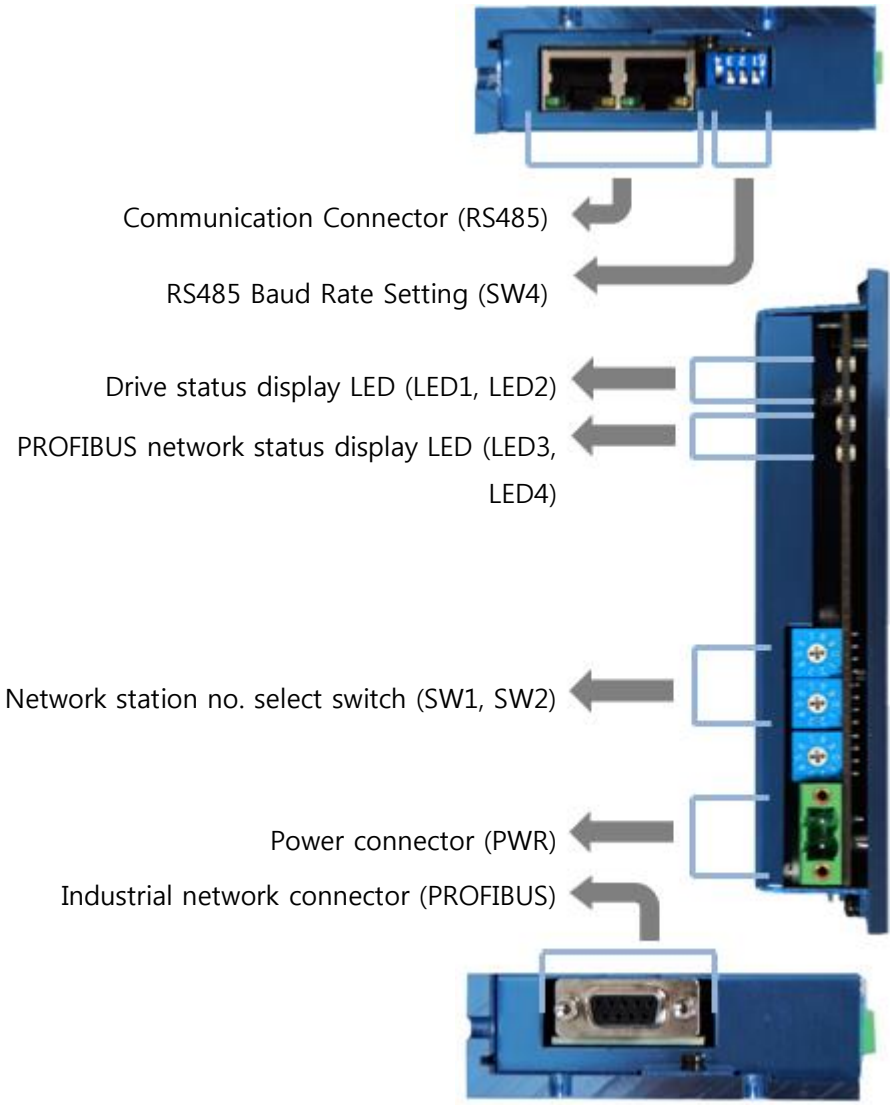
NOTE 2: This complies with the communication protocol of the industrial network.

2.4 Product Appearance

2.4.1 Dimension

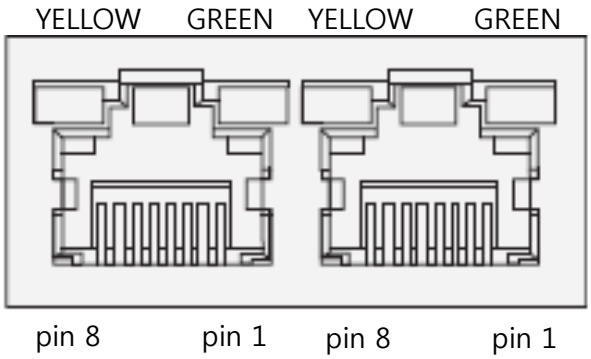


2.4.2 Name of Each Part



2.4.3 FASTECH RS485 Communication Connection Connector

Communication connector shall be connected by RJ-45.



Pin map of communication connector (RS485)

Pin no.	Function
1, 2, 4, 5, 7, 8	GND
3	DATA +
6	DATA -
CASE	Frame GND

LED of Communication Connector

Display	Color	Light type
RS485 TX	Green	Flickers when sending RS485 Data
RS485 RX	Yellow	Flickers when receiving RS485 Data

2.4.4 RS485 Baud Rate setting and Terminating resistance selection switch (SW4)

SW4 is the switch to set the Baud-Rate (communication speed) of RS-485 communication network which is connected to the motor drive. If MOTIONGATE is connected to the end of the network segment, it can determine whether to use the terminating resistance.

SW4.1 shall determine the use of the terminating resistance and SW4.2~SW4.4 are used to set the communication speed.

SW4.1	SW4.2	SW4.3	SW4.4	Speed baud[bps]
X	OFF	OFF	OFF	9600
X	ON	OFF	OFF	19200
X	OFF	ON	OFF	38400
X	ON	ON	OFF	57600
X	OFF	OFF	ON	115200 *1
X	ON	OFF	ON	230400
X	OFF	ON	ON	460800
X	ON	ON	ON	921600

*1 : Initial Setting Value

SW4.1 OFF : The terminating resistance is OFF .

SW4.1 ON : The terminating resistance is ON .

⚠ **CAUTION**	The communication speed setting value of the drive module connected to one RS485 network should all be designated to the same value.

2.4.5 Status Display LED (LED1...LED4)

The Status display LED shall operate LED1~LED4 at the same time according to the situation or operate independently to display the status.

LED Operation Display (LED1~LED4)

LED No.	Operation status	Description
LED1 LED2 LED3 LED4	OFF	Power OFF, timeout, network not connected
	GREEN, RED ON at the same time	The state where MOTIONGATE is booting by the power supply The state of rebooting by changing the station no. designate switch or DeviceNet Baud rate select switch * As GREEN and RED are ON at the same time, the color of LED is seen as ORANGE.
	GREEN flickering at the same time	Self-diagnosis status of MOTIONGATE ✓ Connector is not connected ✓ Wrong setting of network baud rate ✓ Wrong designation of network station no
LED3 LED4	GREEN, RED ON at the same time	Network device of MOTIONGATE cannot be recognized * Contact us or an agent.

Drive Status Display LED (DRIVE STATUS)

LED No.	LED information	LED Name	Operation status	Description
LED1	Drive connection status	ENABLE (GREEN)	ON	The motor of the connected drives is on ENABLE.
			Flicker	The motor of one or more drives among the connected drives are not on ENABLE
	Drive alarm	ALARM (RED)	Flicker	One or more drives triggered the alarm
LED2	Motor drive connect good	CONNECT (GREEN)	ON	All drives executed CONNECT command and communicate with MOTIONGATE normally
		ERROR (RED)	OFF	
	Drive connection status error	CONNECT (GREEN)	ON	There is no motor drive that executed CONNECT command among motor drive connected to RS-485 network. Motor drive and MOTIONGATE is not in communication. Cannot communicate with drive RS485 network communication disconnected Baud rate setting error
		ERROR (RED)	OFF	
	Communication error	CONNECT (GREEN)	ON	Communication error with motor drive (CRC error occurred)
		ERROR (RED)	Random flicker	
	Communication error in multi axis connection status	CONNECT (GREEN)	ON	One or more motor drives connected to RS485 do not respond to the CONNECT command. ✓ Network disconnected ✓ Error in the configuration of topology. ✓ Executed CONNECT command in the IO-Map area of motor drive.
		ERROR (RED)	ON	

⚠ **CAUTION**	Drive Status Display LED can check the motor activation status after checking the communication status of motiongate and drive.

PROFIBUS Network Status Display LED (PROFIBUS-DP1 STATUS)

No.	LED	Operation status	Description	Action
LED 3	RUN (GREEN)	OFF	No initial value	Not initialized for PROFIBUS of top controller
		ON	Initialized	Connected with top controller and normal data communication
		OFF	Self-diagnosis status	Initialized but in self-diagnosis status
	ERROR (RED)	ON	Exceptional error occurred	Exceeded the allowable buffer of MOTIONGATE. Check the sending/receiving buffer of top controller
LED 4	POEWR (GREEN)	OFF	Power OFF	Check the power status
			Network not connected	Check the connection status of PROFIBUS network cable and the status of top controller.
		OFF	Power ON	Normal operation status.
	BF (RED)	Flicker 1	Standby	Waiting the communication from the top controller
		Flicker 2	Parameter setting error	Check parameter setting value of the top controller.

⚠ **CAUTION**	Network Status LED shall operate as the designated expression according to the network status due to the protocol of industrial network.

2.4.6 Network Station No. Setting (SW1, SW2)

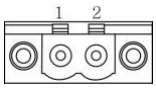
This is the rotary switch which sets the PROFIBUS network station no. (for every top controller, this shall be marked as Node No, FDL Address, Station No, etc) and can be set as the station no. that the network wants. The range of station no. of PROFIBUS supported by MotionGate is 0~99.

Switch value (SW1)	ID No. X10 (10 digit)	Switch value (SW2)	ID No. X1 (1 digit)	
0	00	0	0	
1	10	1	1	
2	20	2	2	
3	30	3	3	
4	40	4	4	
5	50	5	5	
6	60	6	6	
7	70	7	7	
8	80	8	8	
9	90	9	9	

2.4.7 Power connector (DC POWER)

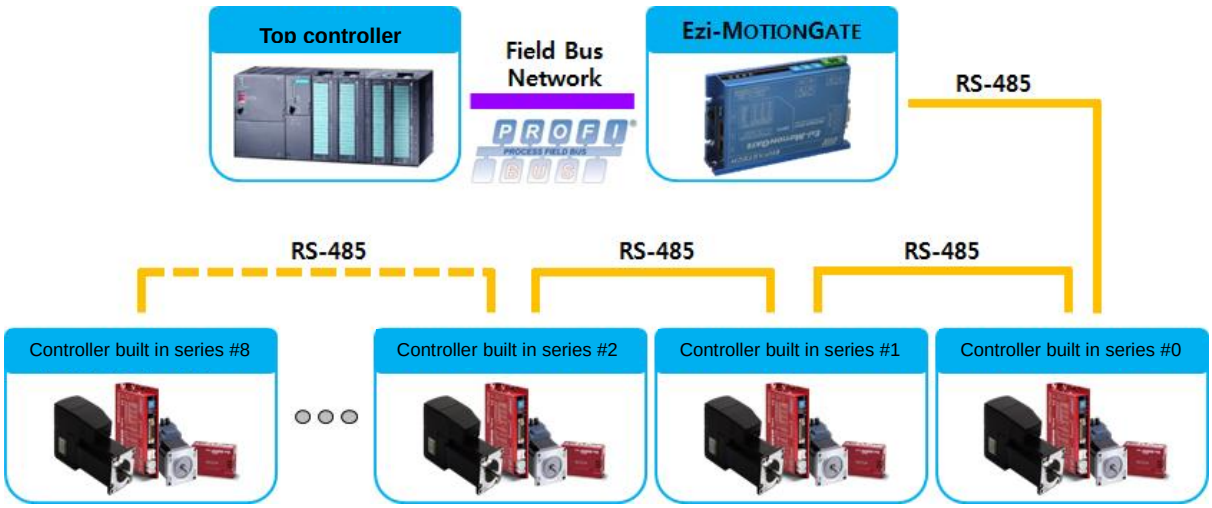
This is the connector to supply the power.

No.	Function	Pin layout
1	Input power : 24VDC ± 10%	
2	Input power : GND	

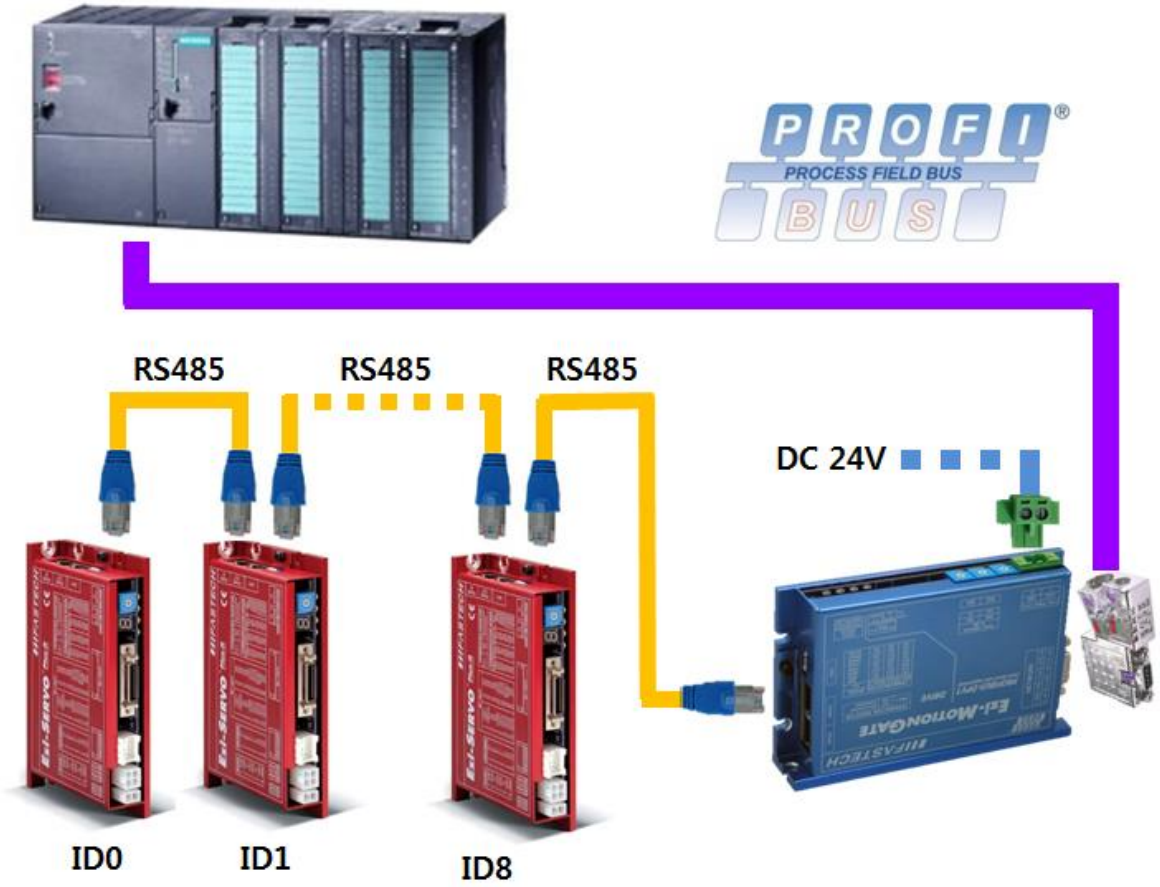


3. Installation & Connection Method

3.1 System Configuration Diagram

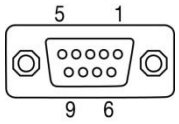


Wiring Diagram of MotionGate

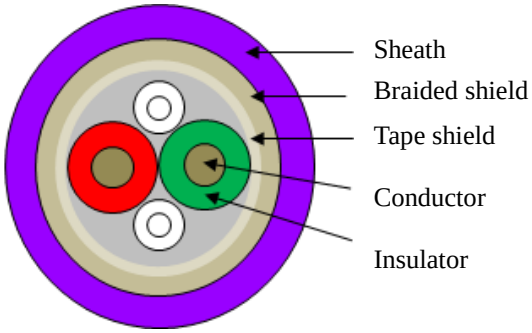


3.2 PROFIBUS Network Connection

Pin Map of PROFIBUS Network Connector

No.	Function	I/O	Pin layout
1	NC	NC	 *NETWORK terminal of MotionGate
2	NC	NC	
3	B Line	I/O	
4	RTS.	I/O	
5	GND	Input	
6	5v	Power output (60mA)	
7	NC	NC	
8	A Line	NC	
9	NC	NC	

PROFIBUS Network Cable Structure

PROFIBUS Network Cable	PROFIBUS Connector
	

Core wire type	Data name
GREEN	A Line
RED	B Line

⚠ CAUTION	For a network connection, use the dedicated PROFIBUS connector and the dedicated cable.

4. Operation Principle

4.1 MOTIONGATE System Overview of PROFIBUS Network

4.1.1 PROFIBUS Overview

PROFIBUS is the open fieldbus specified in EN 50170 and EN 50254 developed by SIEMENS. This network allows for communication without any special interface between different manufacturers and configures the device via the master and slave.

Master device determines data communication on the bus and when the bus access authority is stopped, this allows sending of the message without internal request and always receives calling from the station in operation.

Slave device refers to peripherals such as I/O device, drive device, measurement device etc. They have no bus access authority and only play their roles in sending the response message when requested by master, which is only received by network messaging.

MOTIONGATE is a slave device on PROFIBUS network and a device that receives the command message from the master and responds to it.

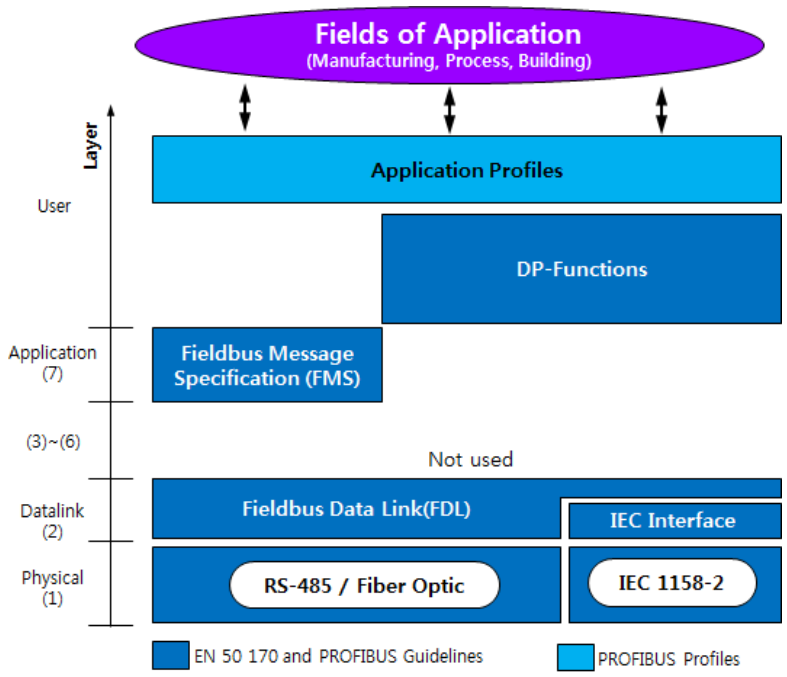
There are three kinds of PROFIBUS : DP, FMS, and PA.

DP(Decentralized Peripherals) secure high speeds with real time processing ability, which lead to cost savings when connecting with peripherals, and is especially widely used in communicating with automation systems and peripherals in the Field Level. This is suitable for substitution of the existing voltage signal (24V), current signal (0~20mA) transmission.

FMS(Fieldbus Message Specification) is a communication mode developed to apply to the communication at Cell Level and should be used as the backbone for inter communication between cells in the system that have several masters (Multi master-System). FMS provides several applications as well as wide flexibility and thus can be used in places where various forms of communication are required.

PA(Process Automation) has an intrinsic safety function that can connect with a sensor and transmitter by linking to the chemical area in the area where a danger of explosion exists. In addition, based on International standard 1158-2, the power supply and data communication of the equipment is available by one cable (two-layered wire).

PROFIBUS Protocol Structure



PROFIBUS network applies the reference model of OSI (Open System Interconnection) by ISO 7498 and for PROFIBUS-FMS, it uses three layers : Layer 1 (physical area), Layer 2 (data link), Layer 7 (application). On the contrary, the PROFIBUS-DP that MOTIONGATE supports uses Layer 1 and Layer 2 to secure very fast and efficient data transmission and the Direct Data Link Mapper (DDLM) enables a user interface to connect to a Layer 2 area more easily.

The physical area of PROFIBUS-DP that MOTIONGATE supports uses RS485 topology. Thus, all devices connected to the network will be connected in a linear manner and will not affect other devices that may have been installed prior to adding or removing the device.

This feature allows for processing mass data at high speeds and for connecting field information to the top rapidly, which lead to improvements in productivity. In addition, due to the RS485 topology, it is easy to install and maintain.

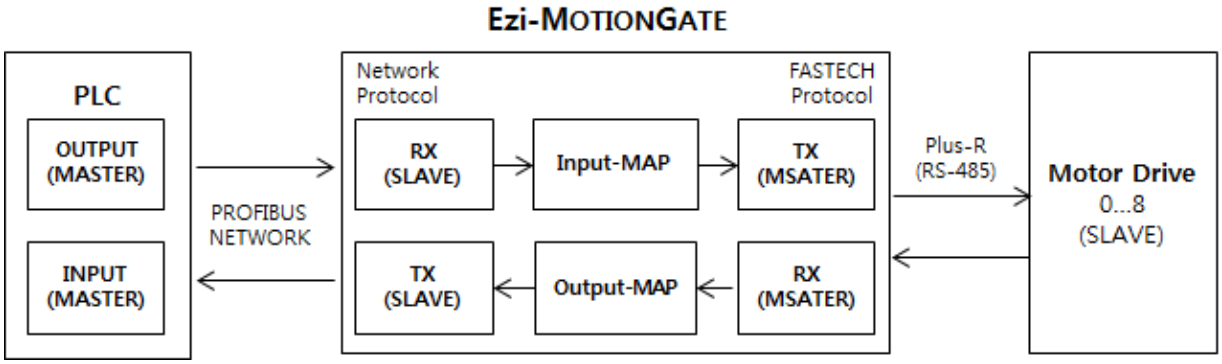
Items	Specification	
No. of station	32ea/1 Segment (Repeater not used) 126ea (Repeater used)	
No. Of Max I/O	6,000 points (depending on the master)	
Communication speed & cable extension distance	12Mbps : 100m 1.5Mbps: 200m 0.5Mbps : 400m	187.5Kbps : 900m 93.75Kbps : 1200m 19.2Kbps : 1200m 9.6Kbps : 1200m
Communication method	Broad Casting Pooling	

4.1.2 MOTIONGATE Overview and Network Configuration

MOTIONGATE used for the PROFIBUS-DPV1 network supports max. 9 motor drives (Axes 0~8). (This varies depending on the MOTIONGATE supporting each network. The quantity available for each network can be checked from *2.2 Product Characteristic Table per Network)

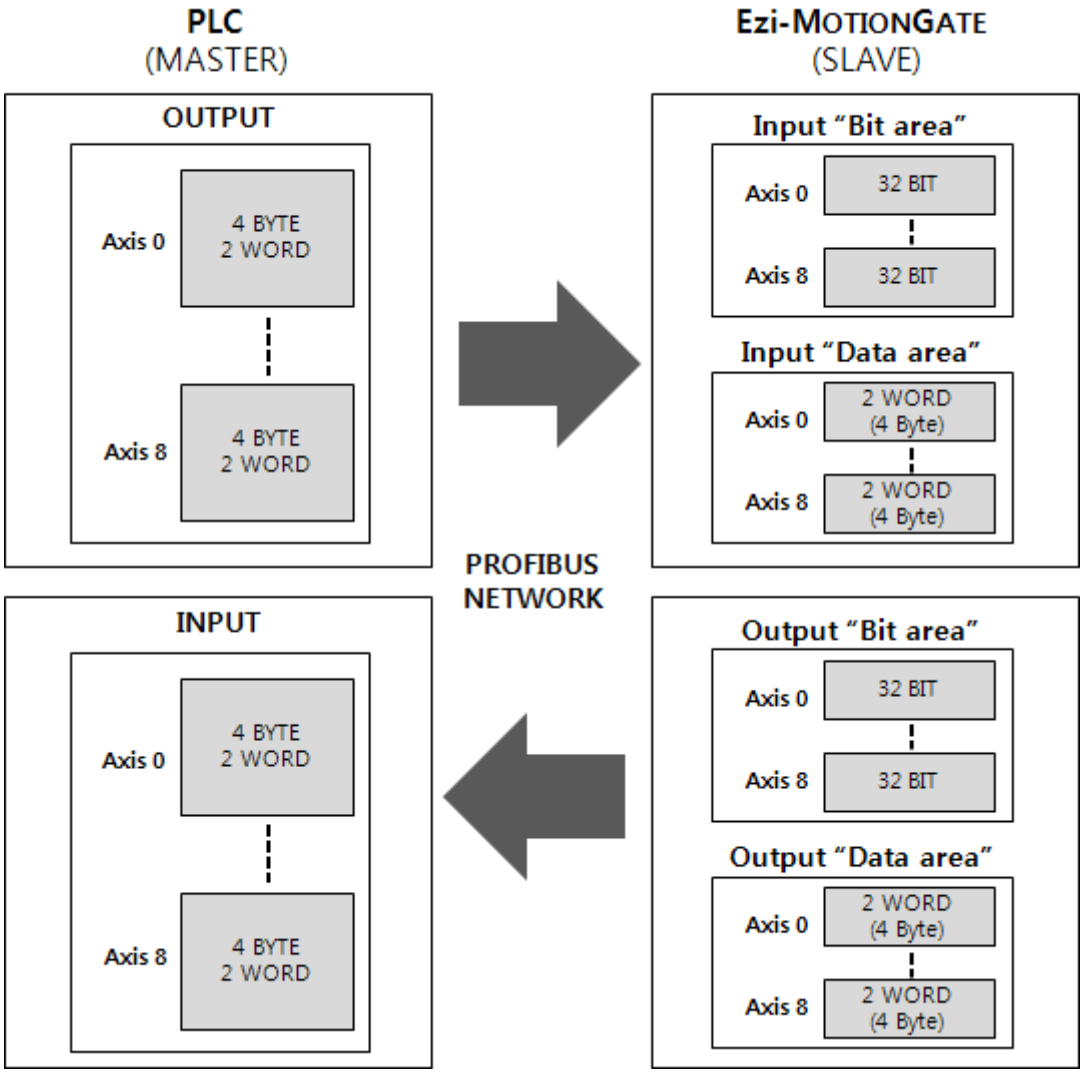
The top controller (PLC) should be the master system that can access the memory address of the sending/receiving section connected with MOTIONGATE. And MOTIONGATE becomes the master system that can access the sending/receiving section of the connected motor drive.

The Input-Map data received from the PROFIBUS-DPV1 network controls the corresponding axis and the response information of the corresponding axis shall be configured by the Output-Map and send the data for the top controller to PLC.



The command for each motor drive connected to MOTIONGATE at PROFIBUS-DPV1 network requests commands and information by using the data configured by IO-Map. Here, the address area of IO-Map is the area to verify the control command and response information for each axis. The data configuration of IO-Map is divided into Bit area which is configured by 32 bit for one axis and Data area which is configured by 2 WORD (4 Byte).

The top controller (PLC) is the data address area of IO-Map and can verify the control and response data.

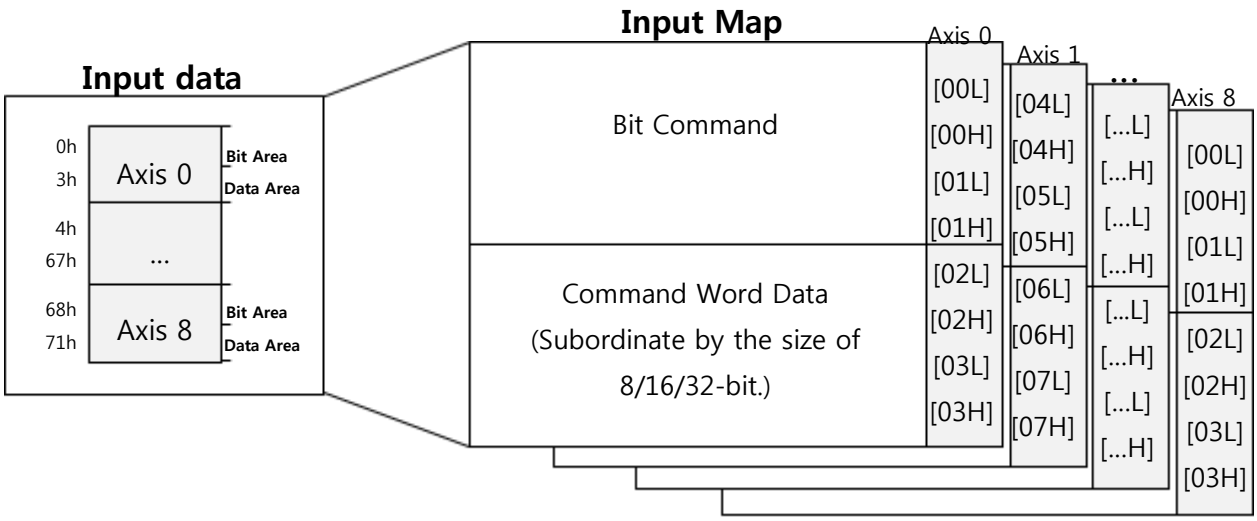


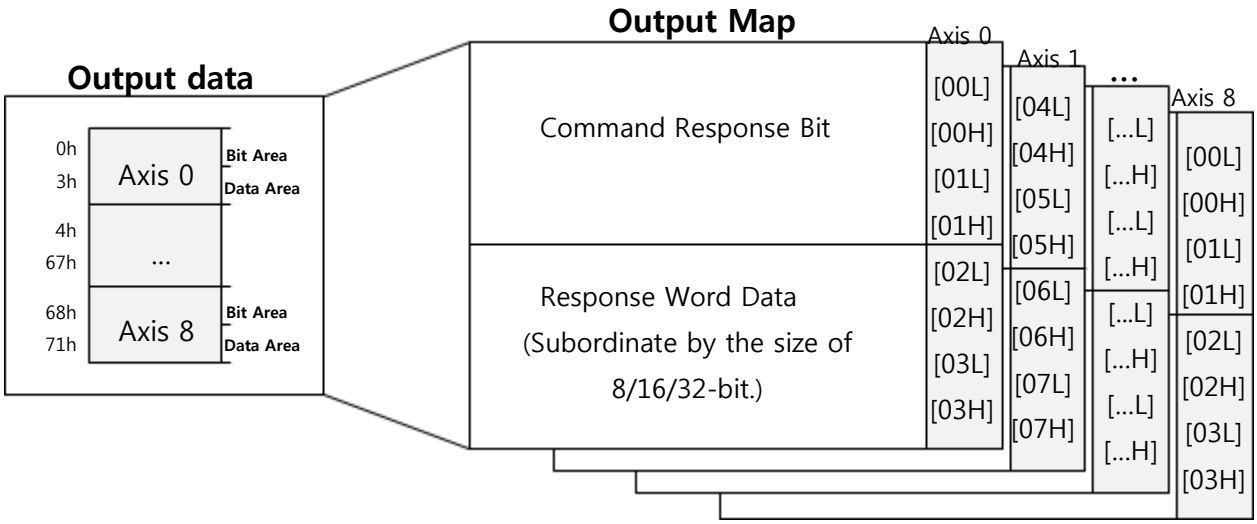
The IO-Map data address area of MOTIONGATE occupies 72 bytes of sending/receiving buffer area in the top controller. (The Input-Map and Output-Map for one axis occupies 8 Byte[4WORD] each respectively.)

The IO-Map is divided into bit area [0-3] and data area [4-7].

The Bit area of the Input-Map is used as the section for bit command of the motor axis and the Data area is used as the section to enter the data information corresponding to the Bit Command. The bit area of the Output-Map is the status flag of the corresponding axis or Command Response bit for control command, and the WORD area is the section where the data of Input-Map commands shall be saved.

In the IO-Map structure, the byte area from the first address to the fourth address is the IO-Map for Axis-0 which is connected to the IO-Map of Axis-1 and connected to the sending section of Axis-8 with 8 byte interval.





NOTE 1: Device memory 1WORD of the top controller is 16Bit data (2 byte). Therefore, the address of device memory for 0h (00.0~00.7) occupies 0 Byte of IO-Map and 00.8~00.15 occupies 1 Byte.

NOTE 2: Device memory that data area uses is 2WORD. Thus, it can use the DWORD address for the start address of the data area.

4.2 Control Command Bit Area (Input Map) and Status Information Bit Area(Output Map)

Bit Configuration of Input-Map

Input-Map is the area that commands the control of the motor drive. The combination of bit for command enables the selection of motion control of the motor drive, setting the response information type, setting the value of parameter or PT Information, etc.

Bit Area of Input-Map (High 4 Byte Area)

BYTE offset	BIT	Bit name	level	Description
0	0	CONNECT	Rising Edge	The use of corresponding axis will be determined by setting up this bit. If this bit is set as '1', communication between the corresponding axis will be attempted and if the communication to the corresponding axis is not required, this number should be set as '0'. If it is set as '0', the communication with the corresponding axis is excepted and no command will be executed. If many commands to multiple axes are generated simultaneously, the processing sequence will be started from the low to high number of motor drive. If one event for one axis is completed, the process for the next ID axis will be started. If there is no command or event from corresponding axis, MotionGate will receive the data for the status information and response request from corresponding axis. - Status information of corresponding axis (flags FLAG-define) - Command position (signed long 32-bit) - Actual position (signed long 32-bit) - Position error (signed long 32-bit) - Current driving speed (signed long 32-bit) - Current driving PT number **NOTE 1:** MotionGare executes the Fas_GetAllStatus() function command frequently. **NOTE 2:** Motor control delaying time will be twice more than the number of connected axes in case the motor has the same delaying time.

BYTE offset	BIT	Bit name	level	Description
	1	ENABLE / IGNORED	Rising Edge	SERVO Drive: The status of corresponding axis will be converted to the motion available status. 0 : ServoOFF 1 : ServoON STEP Drive: This bit command will be ignored.
	2	nESTOP	Falling Edge	Stop of execution of motion or all commands. (Emergency stop) * 0: Execute the E-Stop Command, 1: Standby of the E-Stop Command
	3	ALARM_RESET / MOTOR_FREE	Rising / Falling Edge	SERVO Drive: This will be used when releasing the generated alarm (positive edge operation) * Motor free status of step drive will be maintained when MOTOR_FREE bit is maintained as '1' and the step motor alarm reset command will be executed in negative edge when it is changed to '0'.
	4	CMD_START	Rising Edge	Executing 'Speed Override' command when ordering 'Jog Run' command. Use when moving the position or execute the PT drive or executing the original point move command.
	5	-	-	-
	6	-	-	-
	7	MOTION /SETTTING	H/L	A bit that selects the MotionGate Map as motion or set-up. 0: Motion control mode 1: Set-up mode
1	0	CMD_CODE0	H/L	**During Motion control mode** 0000(0): General move (Jog, Step, Zero point move) 0001(1): Relative value move [Incremental Move], Absolute value move [Absolute Move] 0100(4): PT Drive (PT Drive, Single PT Drive) 0111(7): Original point move (Origin) **During set-up mode** 0000(0): No command 0101(5): Verifying the version information 1000(8): Parameter request 1001(9): Parameter write 1010(10): Position informaiton change 1100(12): Alarm log request 1101(13): Alarn log delete 1110(14): Parameter save
	1	CMD_CODE1		
	2	CMD_CODE2		
	3	CMD_CODE3		

BYTE offset	BIT	Bit name	level	Description
	4	RESPONSE_TYPE0	H/L	Define the response format of desired response data from RX section of the corresponding axis. 0000(0): Do not request the response data. 0001(1): Command position 0010(2): Actual position 0011(3): Position error 0100(4): Present speed 0101(5): Driving PT number 1000(8): Currently generated alarm number *** Do not use in set-up mode**
	5	RESPONSE_TYPE1		
	6	RESPONSE_TYPE2		
	7	RESPONSE_TYPE3		
2	0	CANCEL	Rising Edge	General stop of motion
	1	HOLD	Falling Edge	Hold during motion
	2	-	-	-
	3	GO_ZERO_POS	Falling Edge	Move to the designated Zero position from corresponding axis driving (position value: 0)
	4	-JOG_MOV	Falling Edge	Reverse direction JOG drive Input value of data area: speed rate, speed value, speed step number.
	5	+JOG_MOV	Falling Edge	Forward direction JOG drive Input value of data area: speed rate, speed value, speed step number.
	6	-STEP_MOV	Falling Edge	Positive/negative move using inside parameter value (such as position and speed) of MotionGate. Input value of data area: Number of position value (0~3) * This can be redefined by user.
	7	+STEP_MOV	Falling Edge	Increase/decrease of move using inside parameter value (such as position and speed) of MotionGate Input value of word area: Number of position value (0~3) * This can be redefined by user.

BYTE offset	BIT	Bit name	level	Description
3	0	INC/ABS	H/L	A bit that selects either relative value move or absolute value move when the controlling method is position move (CMD_CODE:0001). 0: relative value move 1: absolute value move
	1	-	'	-
	2	SPD_MODE	H/L	Use for the Jog move when controlling method is general motion (CMD_CODE: 0000). 0: Jog drive using input ratio or speed step number 1: Jog drive using input speed
	3	-	'	-
	4	SINGLE_PT	H/L	A bit that selects either general PT drive or single PT drive when controlling method is PT drive (CMD_CODE:0100). 0: general PT drive 1: Single PT drive
	5	-	'	-
	6	-	'	-
	7	-	'	-

NOTE: Input Map is the area where MOTIONGATE enters the command with PLC or Master.

Bit Configuration of Output-Map

For the section of Output-Map, the loop-back bit for data flag and Bit Command exists. The Loop-back bit is the bit that responds the same way as the command event of the corresponding bit and enables verification of the bit input of Input-Map. The status flag shall be displayed based on the data information received by communicating with the corresponding Motor Drive.

Bit Area of Output-Map (High 4 Byte Area)

BYTE offset	BIT	Bit name	level	Description	BYTE offset
0	0	CONNECTED	H	status bit	Set this bit a '1' when connected to the Plus-R of corresponding axis
	1	ENABLED MOTOR_FREE (STEP)	H	status bit	Set as '1' when Servo ON of corresponding axis or Step motor is in Normal status. * This will be the response bit for Motor Free command when in STEP Drive status.
	2	ESTOP_RESP	H	Loopback	Set as '1' if the emergency stop command is executed by Loopback bit of nESTOP bit of Input-Map.
	3	ALARM_ERROR	H	status bit	It will be set as '1' automatically when alarm is generated from the motor drive of the corresponding axis. It will be cleared to '0' when alarm is released.
	4	CMD_RESP	H	Loopback	Loopback bit of CMD_START bit of Input-Map.
	5	OUT_RANGE	H	status bit	Set as '1' if the data area value of Input-Map does not match to the corresponding command value.
	6	READY	H	status bit	It will be set as '1' if the command for the current corresponding axis is in operable status. No command is operable if this bit is '0'. **NOTE 1:** If READY bit is set as '1' from the setting mode, other axes are controllable.
	7	SET_MOV_RESP	H/L	Loopback	It will be set as '1' if the data of current Output-Map is in setting mode, and will be cleared to '0' in motion mode.

BYTE offset	BIT	Bit name	level	Description	BYTE offset
	0	CMD_CODE_RESP0	H/L	Loopback	Respond to the types of move command 0000(0): General move (Jog, Step, Zero position move) 0001(1): Relative value move [Incremental Move], Absolute value move [Absolute Move] 0100(2): PT Drive (PT Drive, Single PT Drive) 0111(3): Original point move (Origin)
	1	CMD_CODE_RESP 1	H/L		
	2	CMD_CODE_RESP 2	H/L		
	3	CMD_CODE_RESP 3	H/L		
	4	RESPONSE_TYPE_RESP0	H/L	Loopback	Respond to the response data allocated in Word area. 0000(0): Do not request the response data. 0001(1): Command position 0010(2): Actual position 0011(3): Position error 0100(4): Present speed 0101(5): Driving PT number 1000(8): Currently generated alarm number
	5	RESPONSE_TYPE_RESP1	H/L		
	6	RESPONSE_TYPE_RESP2	H/L		
	7	RESPONSE_TYPE_RESP3	H/L		
2	0	MOTIONNING	H/L	status bit	Set as '1' when corresponding axis is in motion status.
	1	HOLD_RESP	H/L	status bit	Set as '1' when in hold status by the command of HOLD bit during operation.
	2	-			
	3	GO_ORIGIN_RESP	H	status bit	Set as '1' when executing the return to parameter original point of Plus-R of corresponding axis.
	4	-	-		-
	5	JOG_RESP	H	status bit	When corresponding axis is in Jog drive.
	6	-	-		-
	7	STEP_RESP	H	status bit	When corresponding axis is in Step drive.

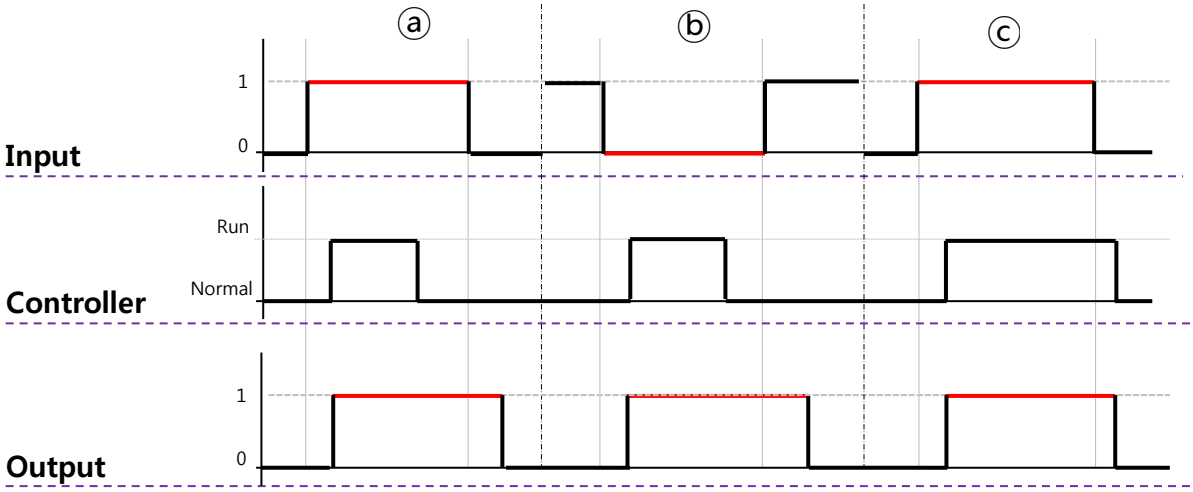
BYTE offset	BIT	Bit name	level	Description	BYTE offset
	0	PT_RUNNING	L/H	status bit	When corresponding axis is in position move.
	1	MOV DIR	L/H	status bit	Displays the rotation direction of motor. 0 : CW(+) 1 : CCW(-) * If FLAG_IN_MOTION bit is set as '1', updated value should be verified. logical operation (FLAG_IN_MOTION &FLAG_nDIR)
	2	INP	L/H	status bit	It will be set as '1' when 'In position' of motor is completed. * This bit is not operable when motor is in STEP status.
	3	ORIGIN_SENSOR	H	status bit	It will be set as '1' when original point sensor is turned ON.
	4	SW_LIMIT_N	H	status bit	It will be set as '1' when '-' direction program limit is exceeded.
	5	SW_LIMIT_P	H	status bit	It will be set as '1' when '+' direction program limit is exceeded.
	6	HW_LIMIT_N	H	status bit	It will be set as '1' when '-' direction limit sensor is turned ON.
	7	HW_LIMIT_P	H	status bit	It will be set as '1' when '+' direction limit sensor is turned ON.

NOTE: Output Map is the area where MOTIONGATE outputs the status information with PLC or Master.

4.3 IO Map Operation Procedure & Condition

4.3.1 IO-Map Bit Command Method

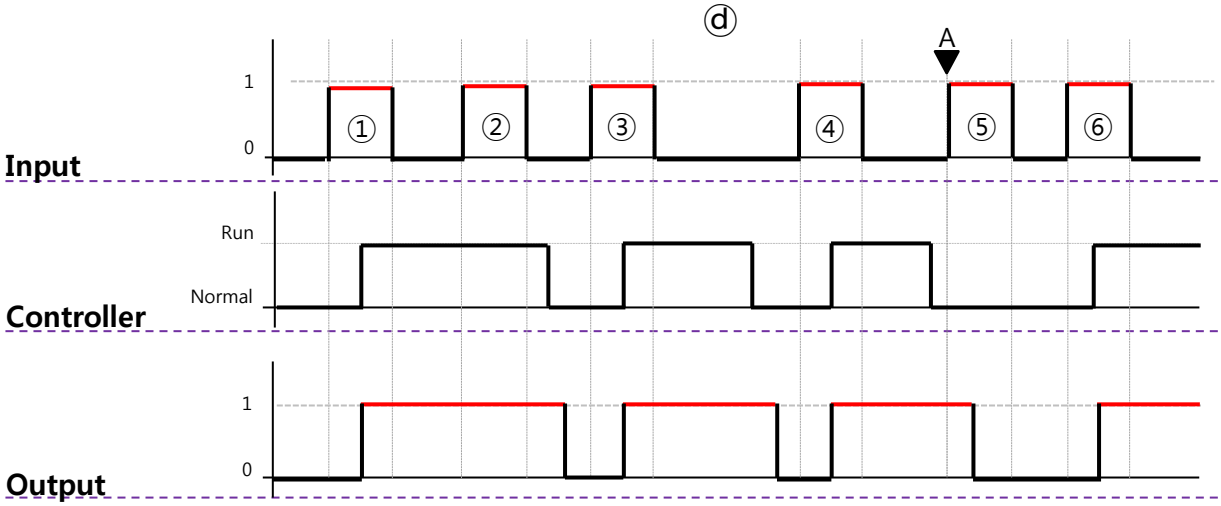
Bit Command shall be divided into Up edge and Down edge Command.



The starting point of the Up edge command of Input is at the point where Status '0' is changed into '1' as shown in section ⓐ. The MOTIONGATE that receives this command delivers the command to the corresponding axis and when that command is running, it shall respond to the command with Output.

The starting point of the Down edge command is the point that the input command is changed from '1' status to '0' as shown in section ⓑ. This event allows MOTIONGATE to deliver the command to the corresponding axis and when that command is running, Output will respond.

The Bit Command shown in section ⓒ is a command that continues until the Down edge issues another command. By the Up edge command of Input, the MOTIONGATE issues a RUN command to the corresponding axis. The sequence of this command is that the corresponding axis runs with the Up edge of input, it responds to the RUN command with Output. And if the operation of the corresponding axis stops, it responds to the Stop of operations with Output.



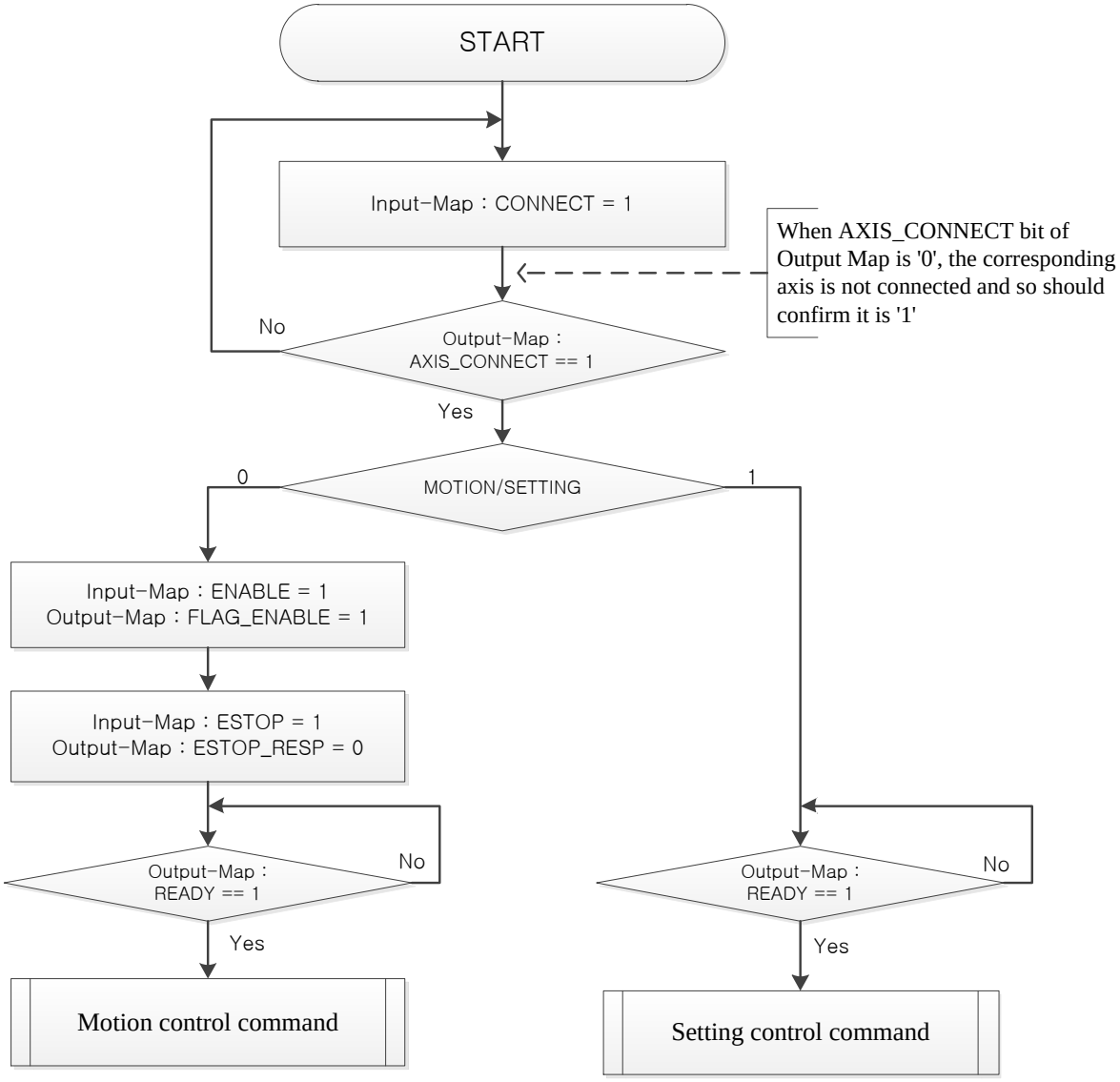
Section ⓓ shows when Input Command operates continuously. In the case with Command of ①, the command starts the same way as section ⓐ. When MOTIONGATE is operating, the entered Command ② does not operate, but can operate with Command of ③ entered after the operation of MOTIONGATE operated by Command ① has completed.

If the command ⑤ is entered at point A, before Output responds to the conclusions of the actions commanded by ④, the command ⑤ is ignored. However, the command of ⑥, which is entered after the response of Output, will be executed. In other words, the actions of the motiongate are executed according to the command of Input; and the command of Input is valid if it is made after the actions of Output have finished.

4.3.2 IO-Map Control Command Ready Sequence

MOTIONGATE needs the process of the following sequence when executing Commands.

Flow Chart 1. Activation condition of Motion and Setting Control Command



※ Command of MOTIONGATE

① Execute the command by setting CONNECT Bit of Input-Map as '1' <Refer to: MOTIONGATE IO-Map *5.2.1>

- As CONNECT Bit is the Bit that selects the use of the corresponding axis, it should be set as '1'
- Verify that the Response Status of the AXIS_CONNECT Bit of Output-Map is '1'

② Select MOTION/SETTING Bit of Input-Map <Refer to : MOTIONGATE IO-Map *5.1>

- Select Motion Control with '0', and Setting Control with '1'.

③ Motion Control shall set ENABLE Bit and ESTOP Bit of Input-Map as '1' <Refer to: MOTIONGATE IO-Map *5.2.1>

- Verify that the response Bit of Input-Map, FLAG_ENABLE Bit is '1'
- Verify that ESTOP_RESP Bit is '0'

④ When executing the Command, verify the status of READY Bit of Output-Map <Refer to: MOTIONGATE IO-Map * 5.6>

- When another Command is running, READY Bit shall be maintained at '0' Status.
- When no Motion Command is running, READY Bit shall be maintained at '1' Status.
- When executing Setting Command, it shall be maintained at '0' Status until the corresponding command is complete.

⑤ The Motion Control of the Drive shall be executed by the Bit combination of IO-Map for Motion Command. <Refer to: MOTIONGATE IO-Map *5.2.2, *5.2.3>

- Set MOTION/SETTING Bit of Input-Map as '0'
- When executing the command of the Motion Control, be sure to set "CONNECT= 1, ENABLE=1, nESTOP=1"

⑥ The verification and modification for the setting value of Drive and MOTIONGATE shall be performed by the Bit combination of IO-Map for Setting Control <Refer to: MOTIONGATE IO-Map *7, *8>

- Set the MOTION/SETTING Bit of Input-Map as '1'
- When executing the Command of Setting Control, be sure to set "CONNECT= 1"

5. IO-Map Use Example

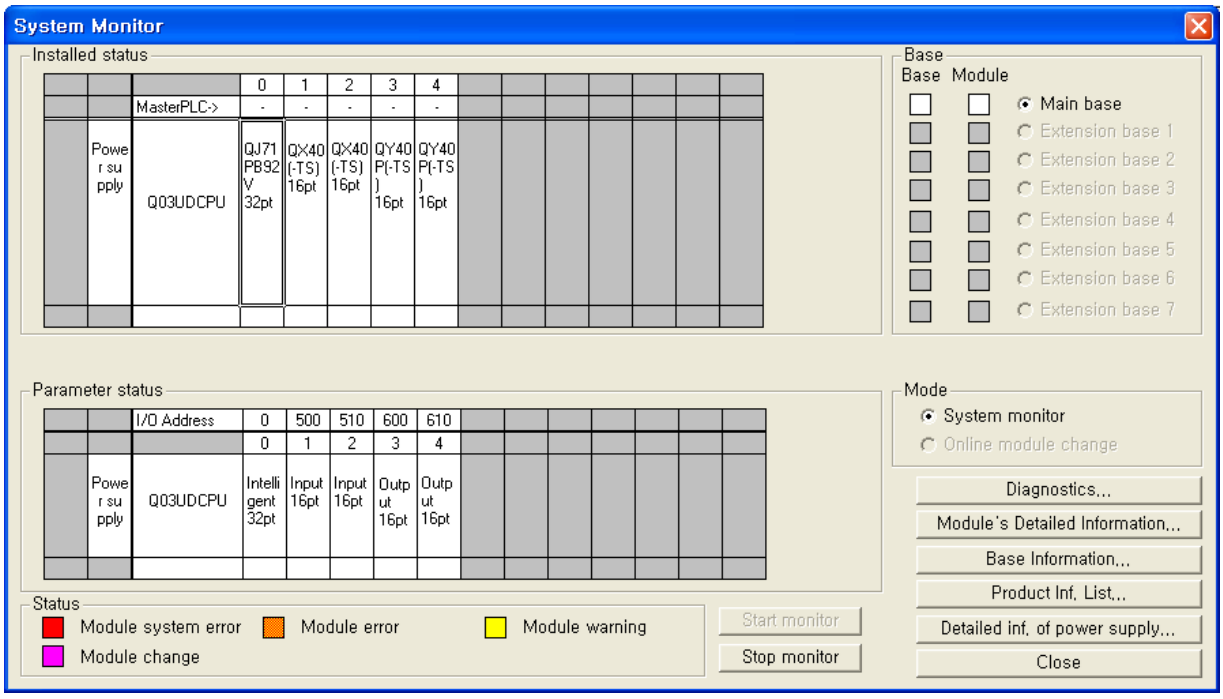
5.1. MELSOFT GX- developer Project Setting

- Main items when setting Network Parameter
  - FDL address : indicates Fieldbus Data Link Address which is the network address. (Node No. or Station No.)
  - Starting I/O Number : I/O address allocated to PROFIBUS Master module which is connected to PLC.
  - Block Transfer : Data change section of PROFIBUS Master module.
    - Input : used as data area of Output Map of MOTIONGATE.
    - Output : used as data area of Input Map of MOTIONGATE.

※ The following example was manufactured based on the following PLCs.

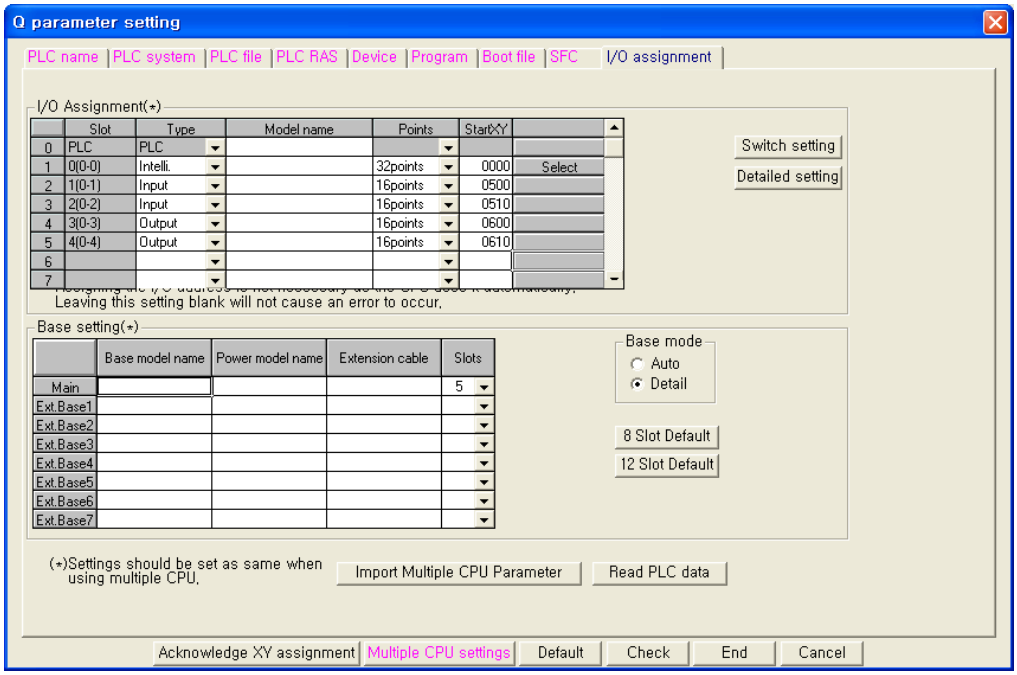
- PLC series : MELSEC-Q
- PLC type : Q03UD
- PROFIBUS-DP module : QJ71PB92V
- MELSOFT GX Configurator-DP
- MELSOFT series GX developer 8

PLC system used for Example

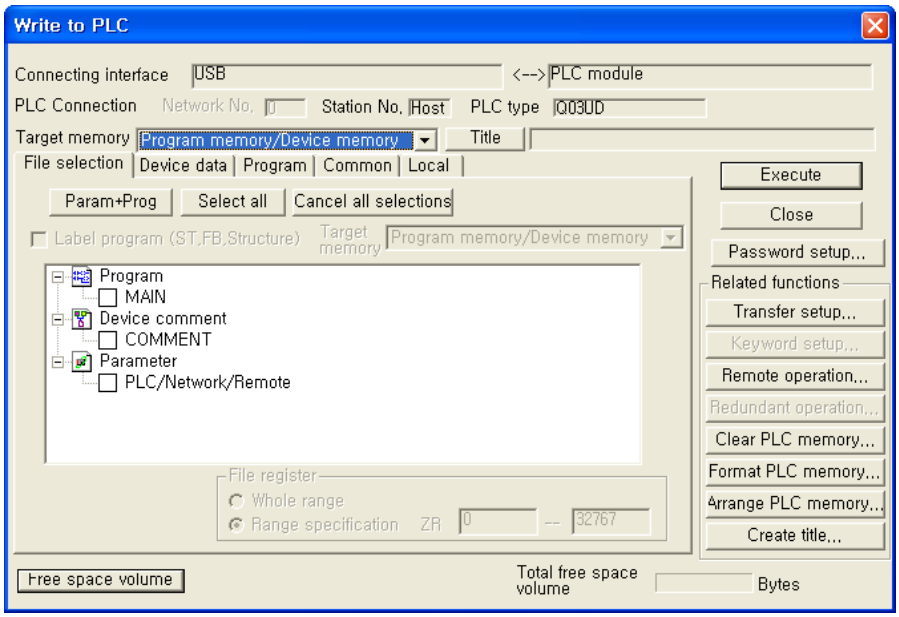


■ PLC Parameter Setting

- In the PLC program GX developer project, set PLC Parameter for I/O allocation as shown in Fig. 5.1.



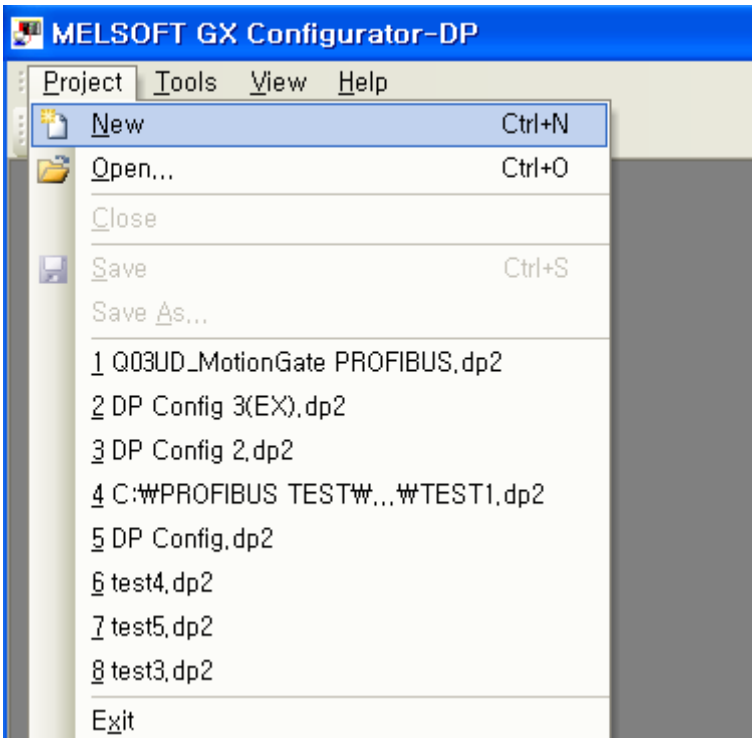
■ PLC parameter download



⚠ **CAUTION**	For the first use of PLC, save the parameter information and prepare so that PLC can be in the normal "RUN" status.

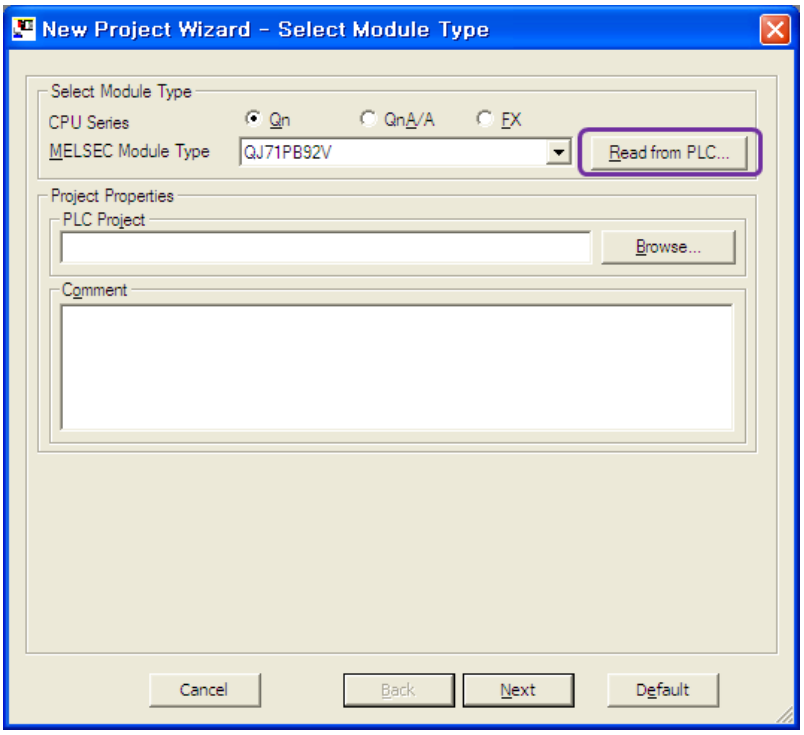
■ PROFIBUS Master Setting

- Use PLC program GX Configurator-DP to set PROFIBUS Master module.
- Select [Project]->[New] of main menu to make a new project.

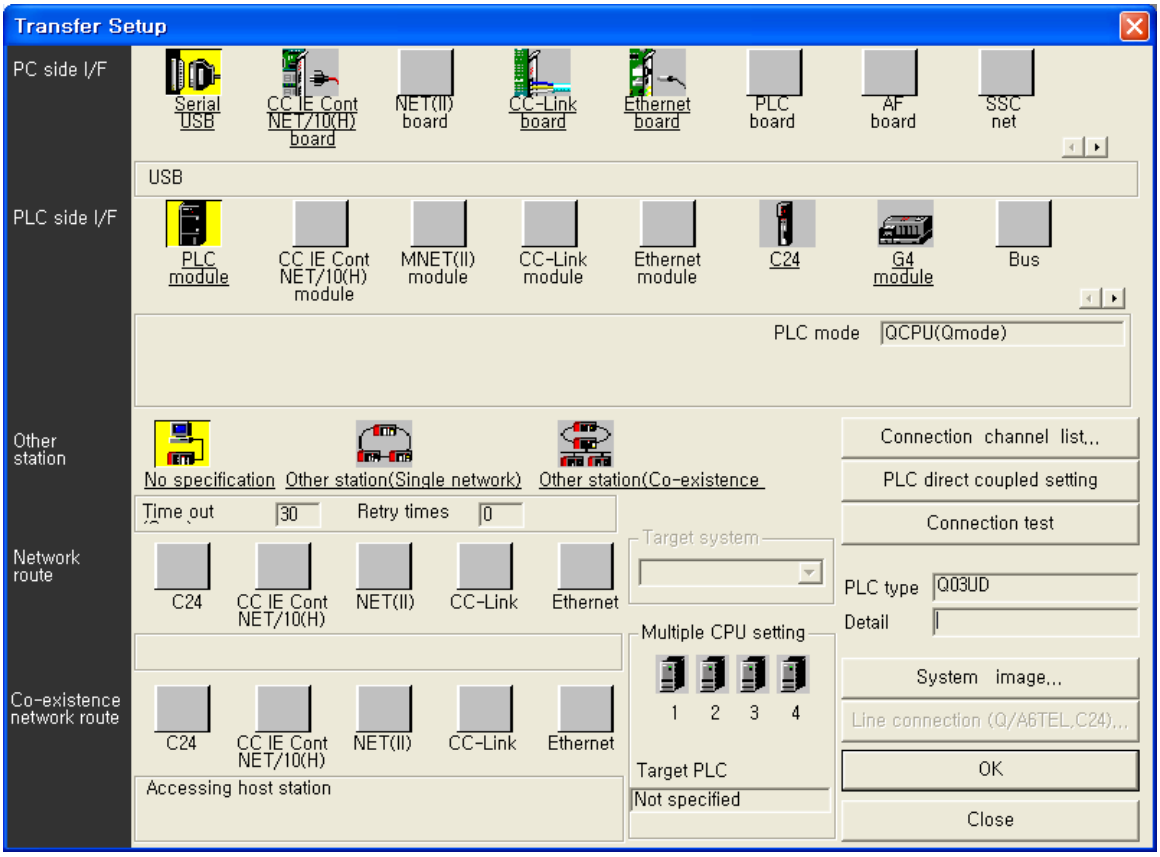


◆ Module selection

- Click Read from PLC to select the desired PLC to use.

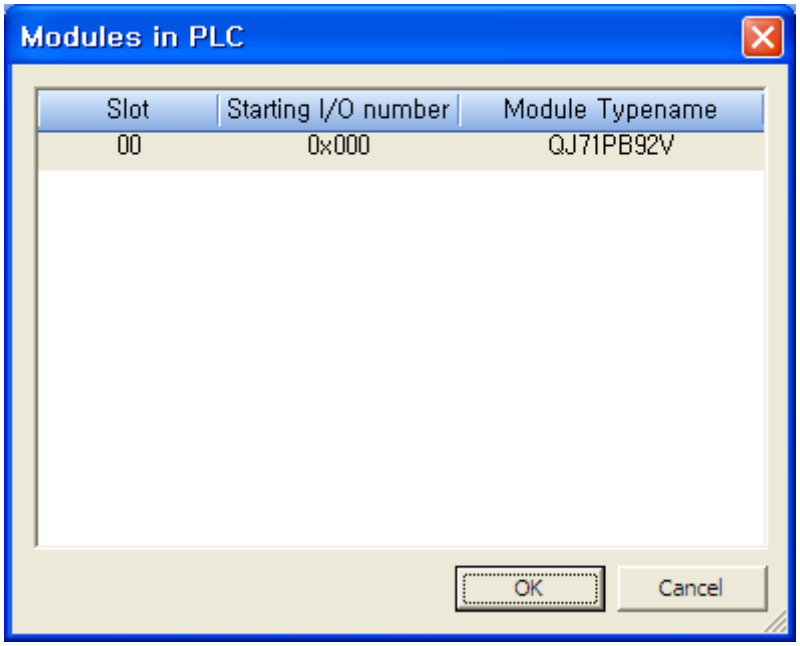


- Check the connection status of PLC.



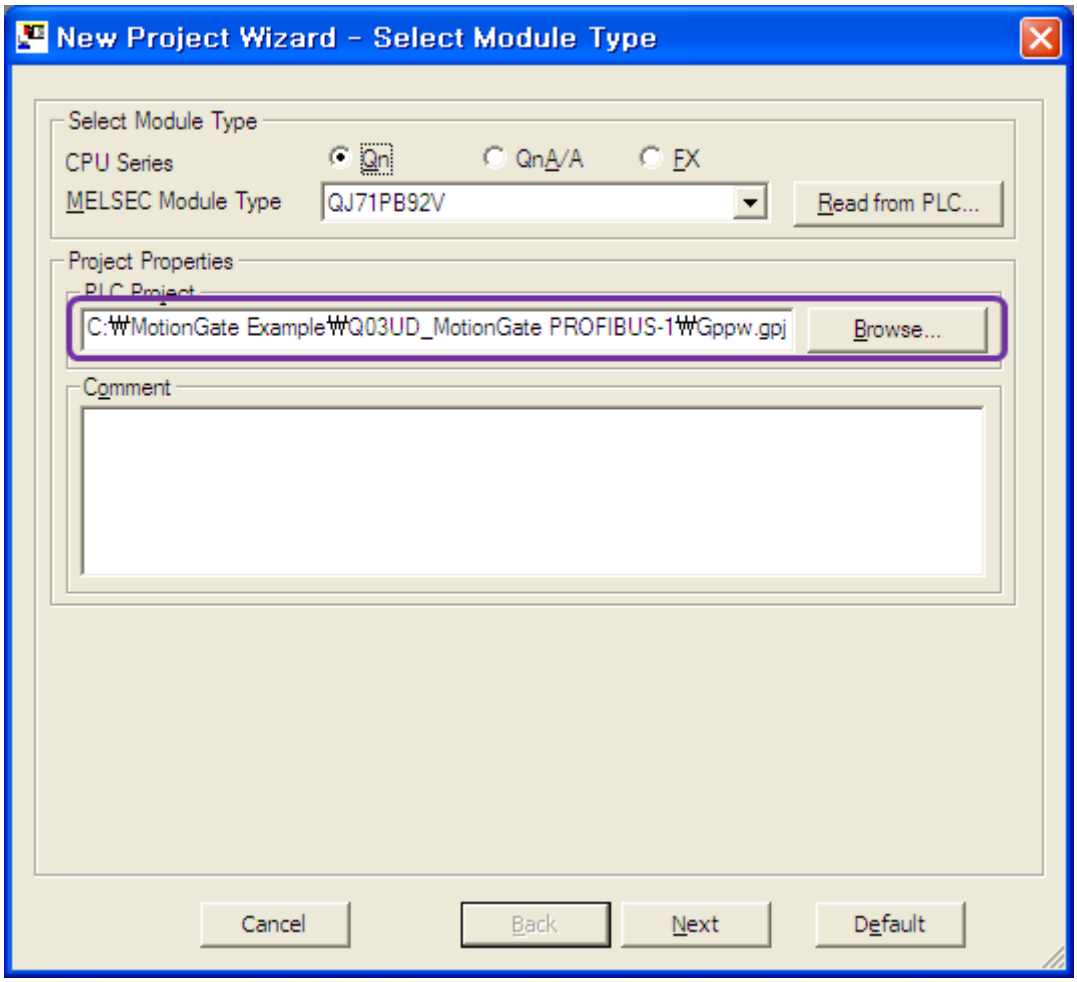
- GX Configurator-DP program, after reading the parameter information of the automatically connected PLC, shows the information of PROFIBUS Master module.

- After selecting the module to use, click the OK button.



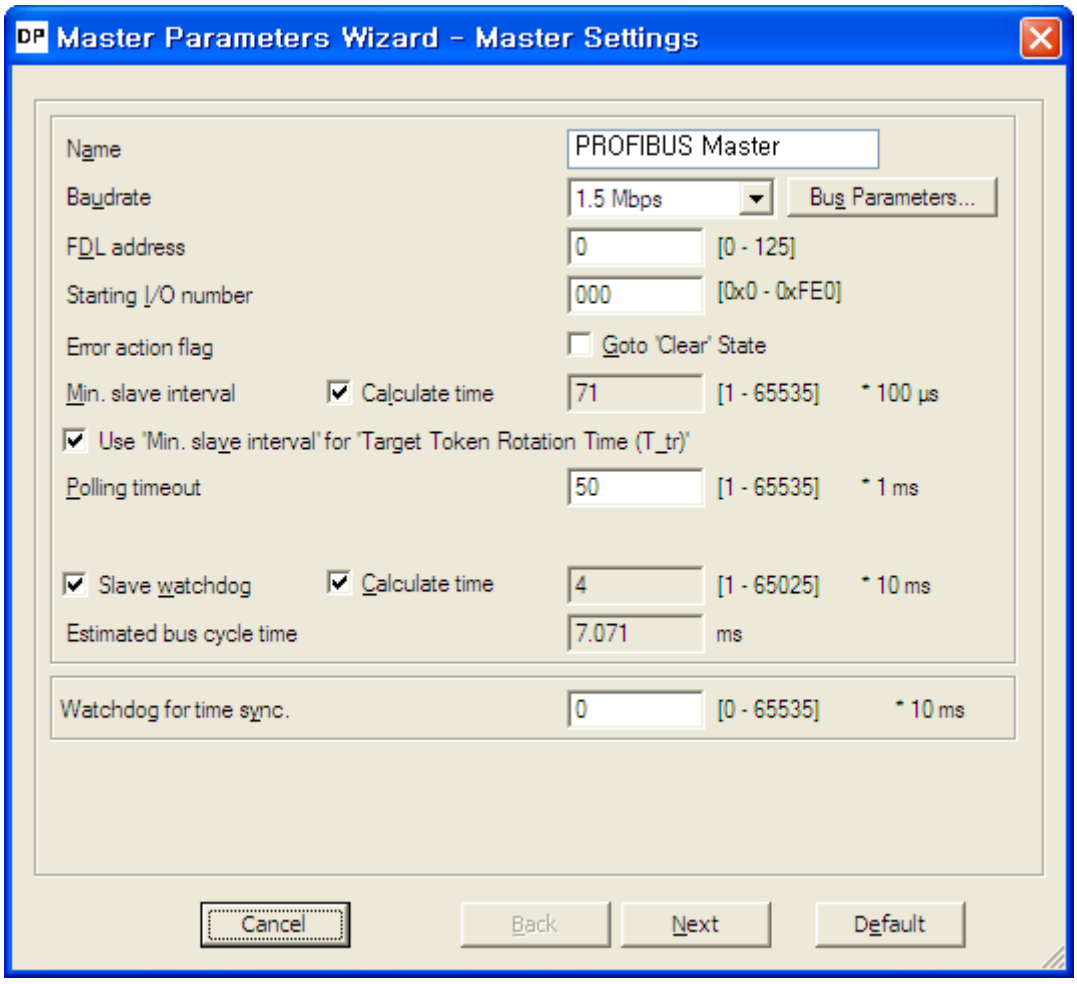
◆ PLC project selection

- Select GX developer project file to add the parameter setting value.



NOTE: This example selected a GX-Developer project file that was created when setting the PLC parameter.

◆ PROFIBUS Master module setting



- Name : Sets the name of the module.

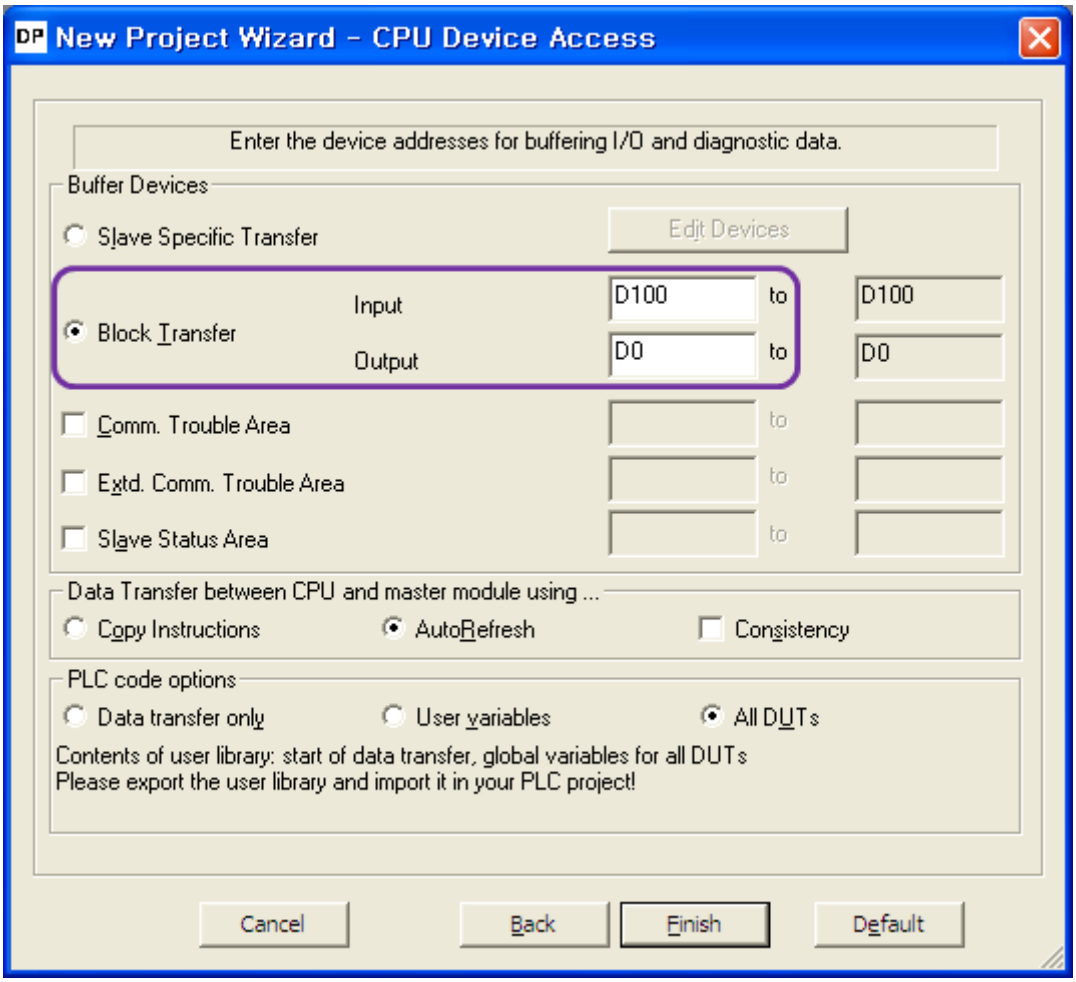
- Baudrate : Baudrate setting value of the PROFIBUS network. MotionGate has Auto Baudrate function and operates with the setting value. If there are any changes, reboot the MOTIONGATE.

- Starting I/O Number : Enters the start IO address set in the PLC parameter. If PLC parameter was read successfully from the previous process, this will be entered automatically.

⚠ **CAUTION**	The setting items except for the things described in this manual are the selection range of the user and thus are subject to change according to the environment of the system.

◆ CPU data setting

- Sets the area where the data of PROFIBUS network is exchanged.



- 『D100』 assigned as input of Block Transfer is the position to start the data area of Output Map.

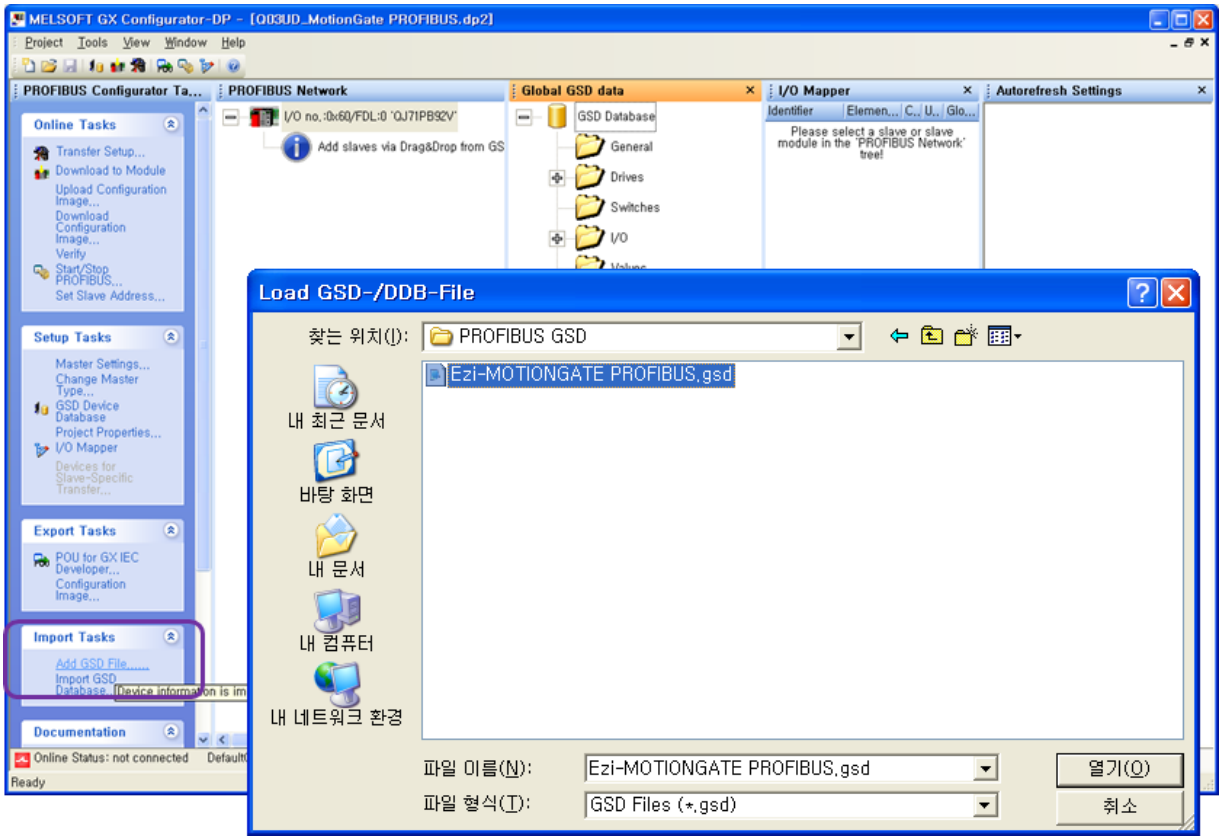
- 『D0』 assigned as output of Block Transfer is the position to start the data area of Output Map.

NOTE: The address of the deactivated area indicates the area used in the PROFIBUS network. Thus, the range varies according to the allocation of I/O memory that the slave equipment used.

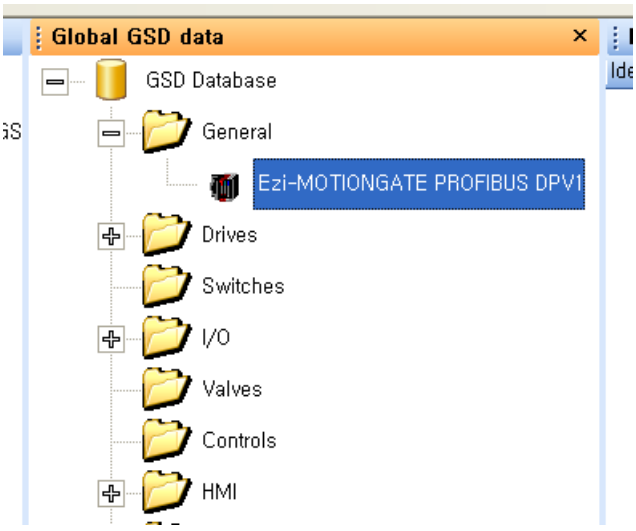
■ Add the information of MOTIONGATE PROFIBUS-DPV1 to the GX Configurator project

- Verify that master setting is complete.

- Click Add GSD File to add a GSD file of MotionGate.



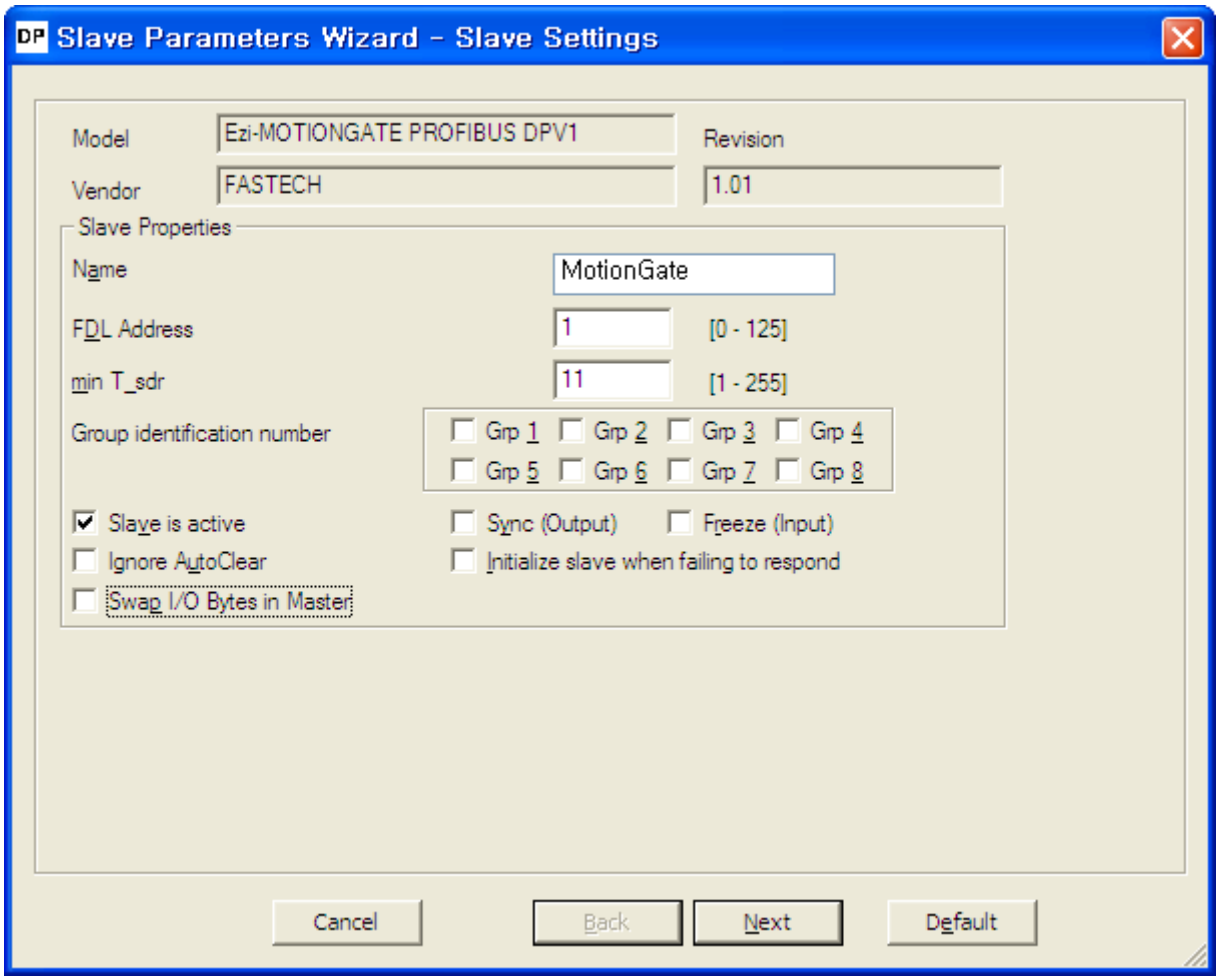
- Verify that the information of MotionGate was added in GSD database.



NOTE: The GSD file of MotionGate can be downloaded at www.fastech.co.kr.

◆ Slave parameter setting

- Double-click the GSD data base of MotionGate.
- Verify the information of the slave device.



- Name : Sets the name of slave equipment.
- FDL Address : the area where the node no. Of PROFIBUS can be selected. Enter the value of area (0~99).
- Check 'Slave is active' to activate the MotionGate that is a slave equipment.

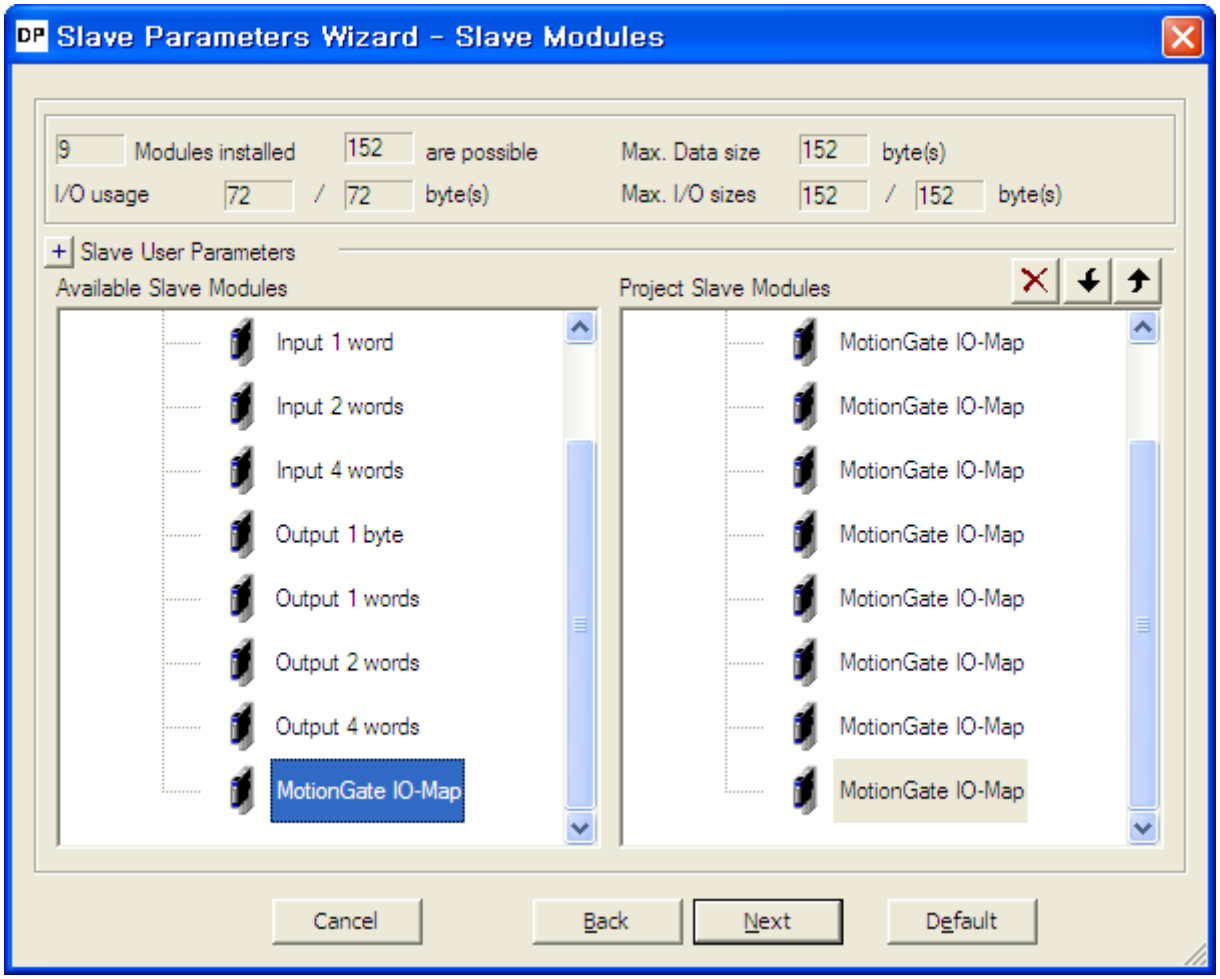
⚠ **CAUTION**	When setting the slave of motiongate, uncheck 『**Swap I/O Byte in Master**』.

⚠ **CAUTION**	The setting except for the things described in this manual is the selection area of the user. Thus, it can be changed according to the environment of the system.

◆ Setting of usable memory for slave equipment

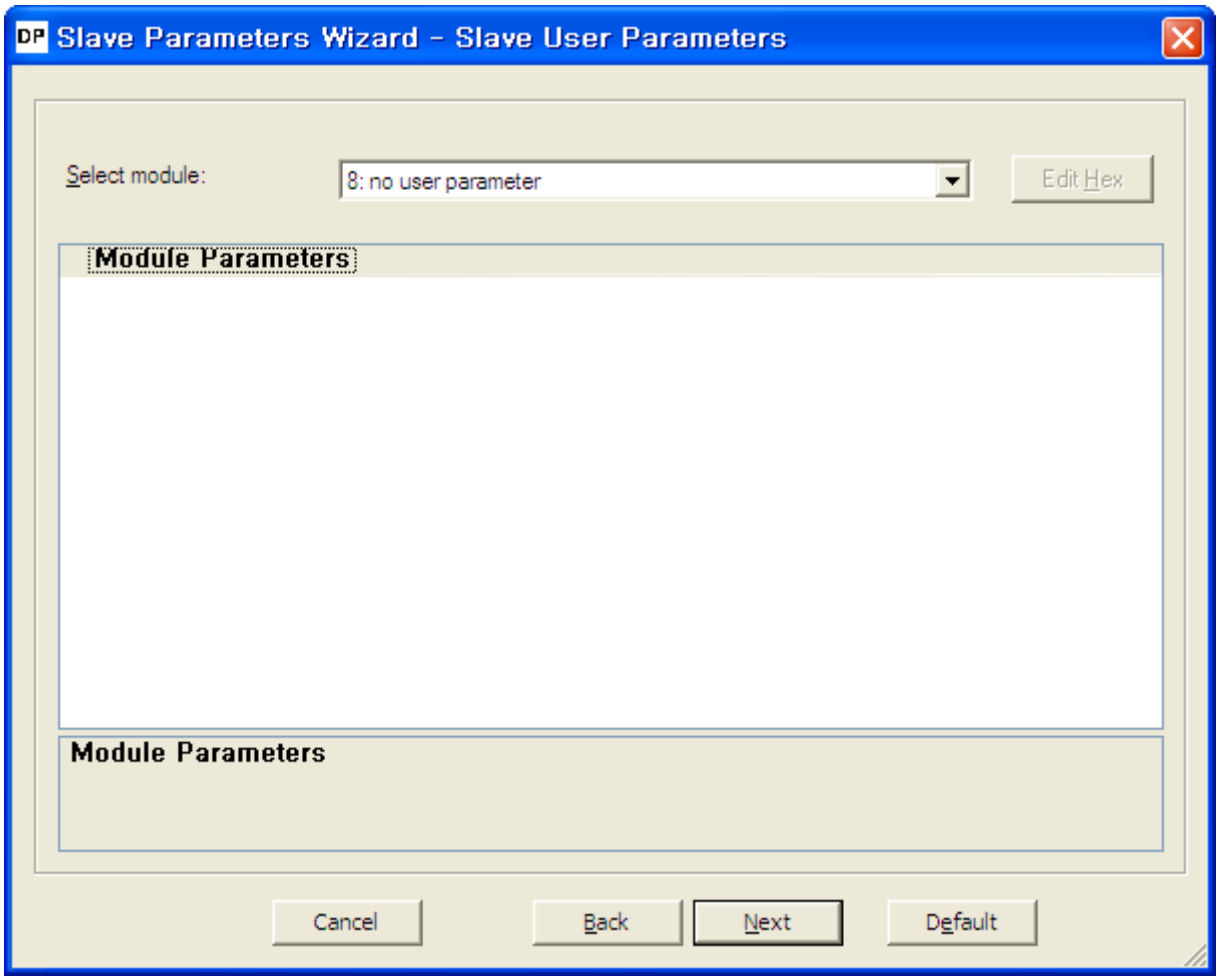
- This is the area to allocate memory space that the MotionGate can use, which needs 72byte for input and 72byte for output.

- Available Slave Modules allow selection of the size of Input and Output by the number of motor drive(n) x 8byte connected to MotionGate.



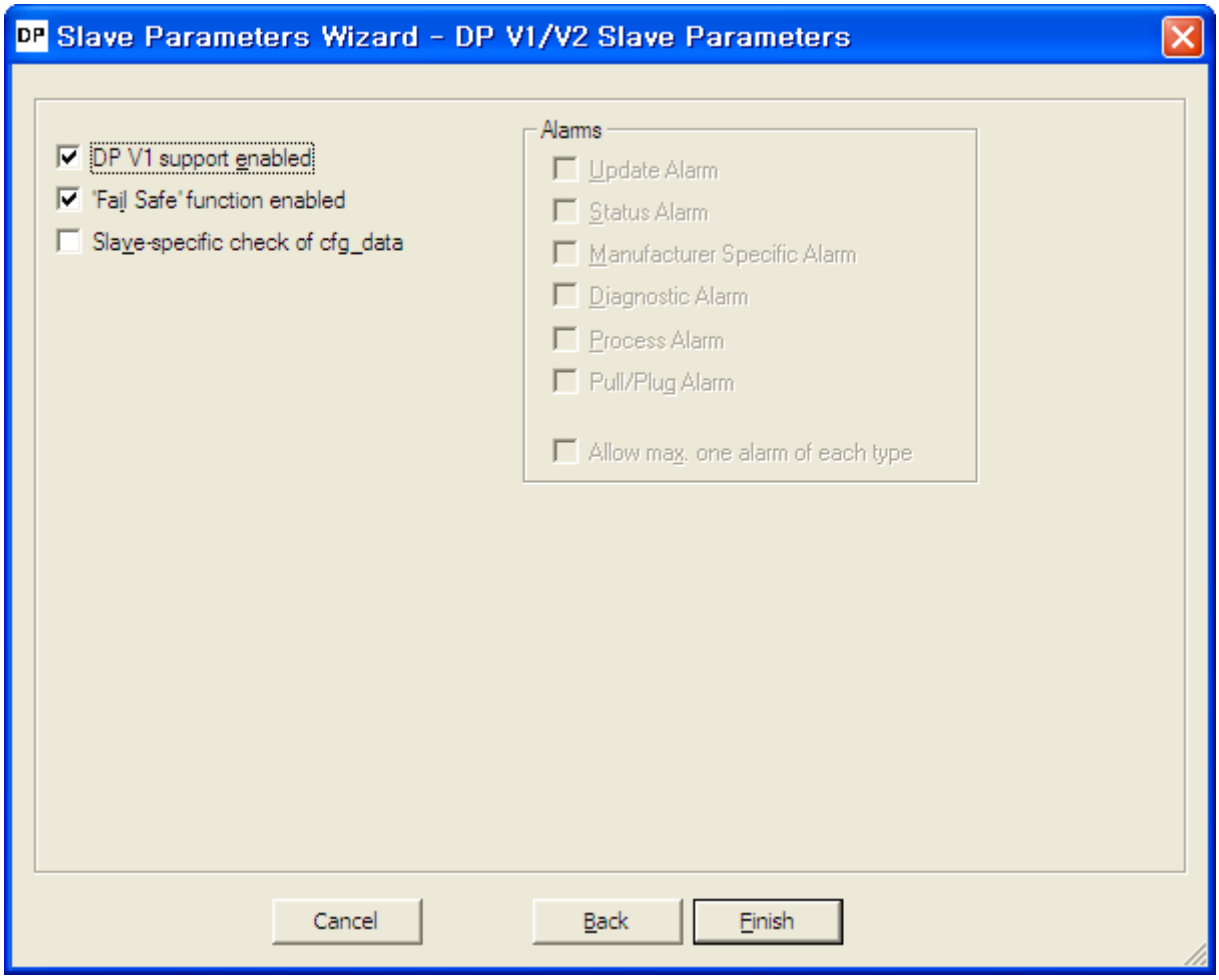
◆ Module parameter setting

- As MOTIONGATE does not have a PROFIBUS slave parameter, just click Next button.



◆ Slave function setting

- Check [DP V1 support enable] to activate the DPV1 support.
- Check ['Fail Safe' function enabled] to activate the self-diagnosis function.



◆ PROFIBUS I/O-Mapping information of GX Configurator project

- GX Configurator enables the verification of network setting information about the project.

Project: Q03UD_MotionGate PROFIBUS.dp2

FDL Addr.	Name	Model	Modules		
			Slot	Model	Global Var.
1	MotionGate	Ezi-MOTIONGATE PROFIBUS DPV1	0	MotionGate IO-Map	vHA60SLV1MOD0
			1	MotionGate IO-Map	vHA60SLV1MOD1
			2	MotionGate IO-Map	vHA60SLV1MOD2
			3	MotionGate IO-Map	vHA60SLV1MOD3
			4	MotionGate IO-Map	vHA60SLV1MOD4
			5	MotionGate IO-Map	vHA60SLV1MOD5
			6	MotionGate IO-Map	vHA60SLV1MOD6
			7	MotionGate IO-Map	vHA60SLV1MOD7
			8	MotionGate IO-Map	vHA60SLV1MOD8

Global Variables

MotionGate.Module Slot 0 : vHA60SLV1MOD0

Element Identifier	Element Type	Class	User MIT-Address	Global Var. Identifier	Buffer MIT-Address
inputs	ARRAY [0..3] OF WORD	Input	-	-	D100
outputs	ARRAY [0..3] OF WORD	Output	-	-	D0

MotionGate.Module Slot 1 : vHA60SLV1MOD1

Element Identifier	Element Type	Class	User MIT-Address	Global Var. Identifier	Buffer MIT-Address
inputs	ARRAY [0..3] OF WORD	Input	-	-	D104
outputs	ARRAY [0..3] OF WORD	Output	-	-	D4

⋮

MotionGate.Module Slot 8 : vHA0SLV1MOD8

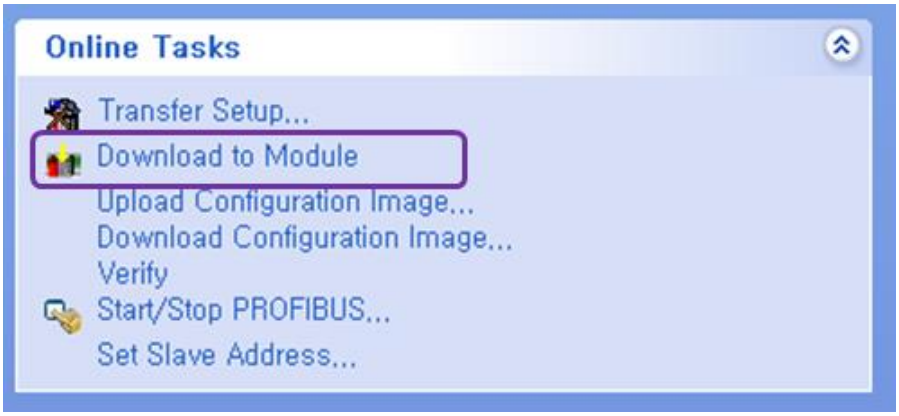
Element Identifier	Element Type	Class	User MIT-Address	Global Var. Identifier	Buffer MIT-Address
inputs	ARRAY [0..3] OF WORD	Input	-	-	D132
outputs	ARRAY [0..3] OF WORD	Output	-	-	D32

* Buffer MIT-Address becomes the start address of each motor drive.

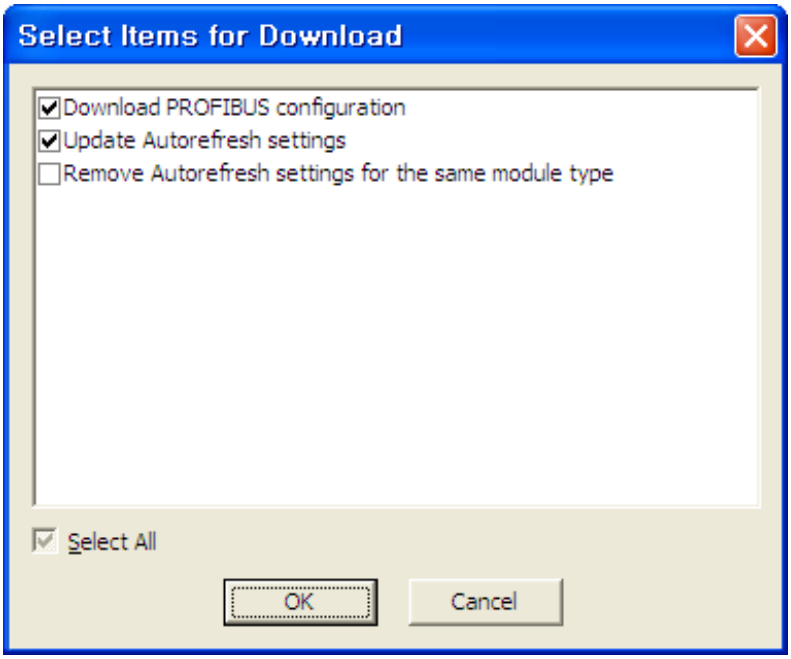
■ GX Configurator project download

a. Complete the master and slave setting of GX Configurator project.

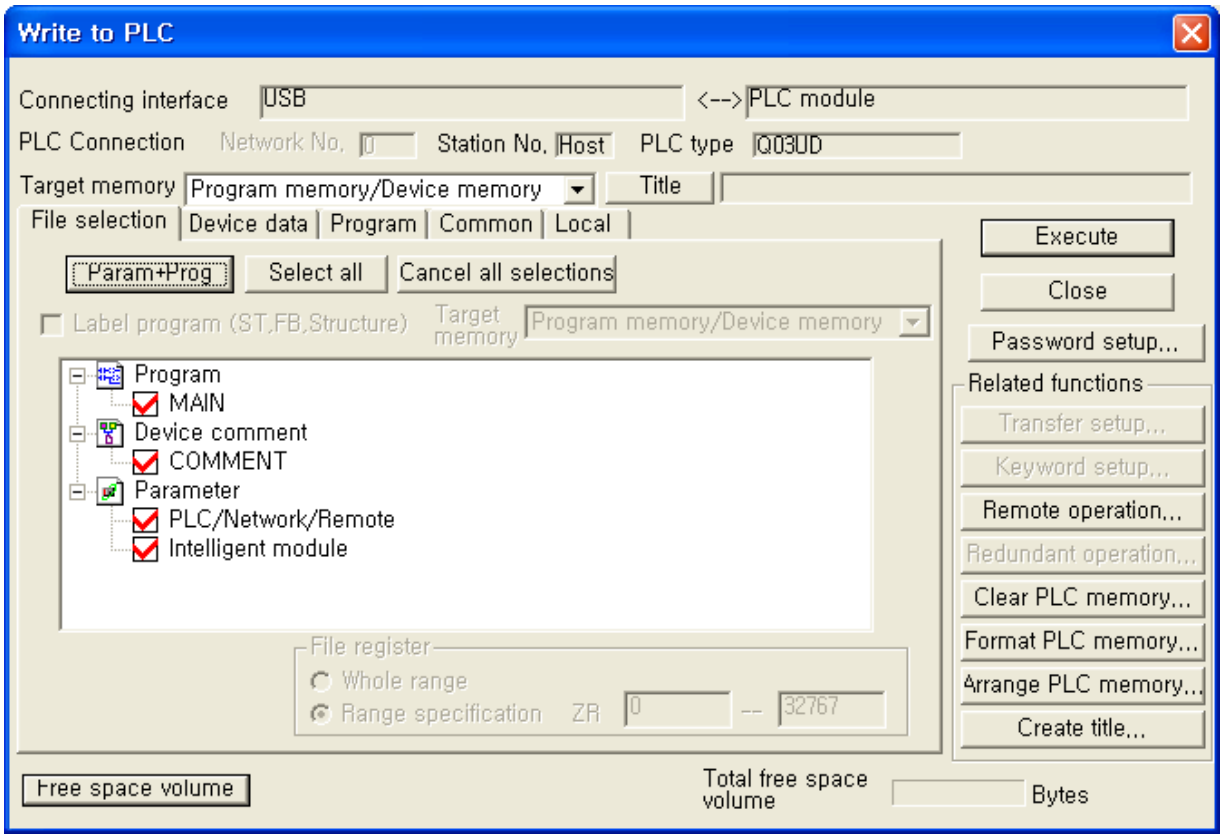
b. Click [Download to module] to execute the download.



c. Select the information to download and then click the OK button..



d. If the download has completed, you will find that the intelligent module column was added when downloading the program from GX-Developer.



NOTE: PLC project of GX Developer set in the beginning includes the setting value of the parameter generated from GX Configurator. When generating a new GX Developer project, you need to restart the setting of GX Configurator.

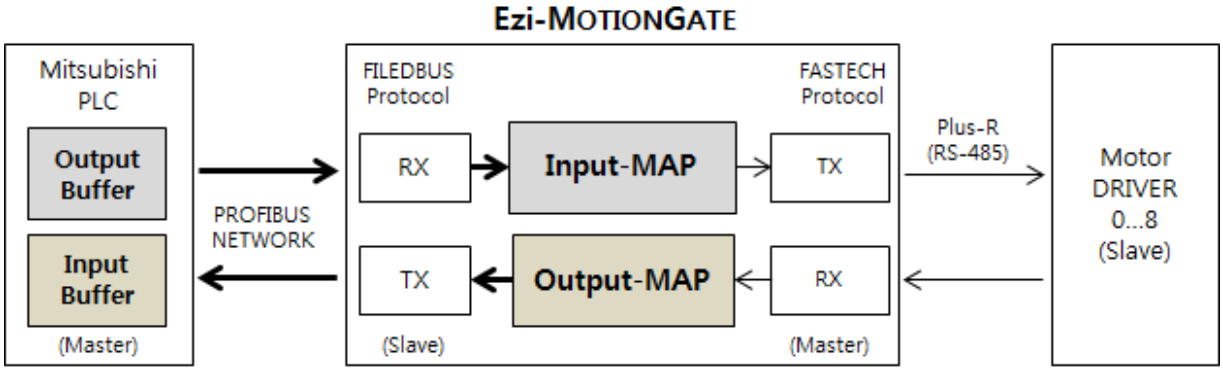
5.2. PLC LADDER Programming Example

■ Data exchange buffer area

MOTIONGATE has the word unit (16bit) address for mutual data exchange through the PROFIBUS network.

- ✓ Input Buffer MIT Address
- ✓ Output Buffer MIT Address

The Input Map of MOTIONGATE specified in this manual shall be defined by Output Buffer which is the PROFIBUS master setting value of PLC. And the Output Map of MOTIONGATE shall be defined by Input Buffer.



■ Allocation of PROFIBUS Buffer address

IO-Map data address area of MOTIONGATE can use PROFIBUS Buffer of top controller up to a maximum of 152Byte. However, when connecting each motiongate, it occupies the buffer memory space of 72byte in input and 72byte in Output and thus when setting the slave equipment of PROFIBUS, the buffer allocation of slave shall be 72byte for Input and 72byte for Output.

As MOTIONGATE needs 8Byte of Input/Output buffer for one motor drive, it is required to allocate 72 byte of Input/Output so that MOTIONGATE uses 9 axes in total. At this time, Slave 1 uses the address from xB#00 and for Slave 2 MotionGate, which uses 4 axes, the address shall be allocated from Xb#72 by 32 byte range. In addition, for Slave 3 MOTIONGATE, which uses one axis, the address shall be allocated from xB#104 by 8byte, following Slave 2. For the slave to be assigned later, the address shall be allocated from xB#112, which is the last address of the allocated buffer.

PROFIBUS Buffer Start Address

Node Address	Buffer Start address			Slave Modules	Motor Drive
	DWORD [ID/QD]	WORD [IW/QW]	BYTE [IB/QB]		
SLAVE 1	0	0	0	In/Out. 0 [8 BYTE]	Axis-0
	2	4	8	In/Out. 1 [8 BYTE]	Axis-1
	4	8	16	In/Out. 2 [8 BYTE]	Axis-2
	6	12	24	In/Out. 3 [8 BYTE]	Axis-3
	8	16	32	In/Out. 4 [8 BYTE]	Axis-4
	10	20	40	In/Out. 5 [8 BYTE]	Axis-5
	12	24	48	In/Out. 6 [8 BYTE]	Axis-6
	14	28	56	In/Out. 7 [8 BYTE]	Axis-7
	16	32	64	In/Out. 8 [8 BYTE]	Axis-8
SLAVE 2	18	36	72	In/Out. 0 [8 BYTE]	Axis-0
	20	40	80	In/Out. 1 [8 BYTE]	Axis-1
	22	44	88	In/Out. 2 [8 BYTE]	Axis-2
	24	48	96	In/Out. 3 [8 BYTE]	Axis-3
SLAVE 3	26	52	104	In/Out. 0 [8 BYTE]	Axis-0
SLAVE 4	28	56	112	In/Out. 0 [8 BYTE]	Axis-0
	30	60	120	In/Out. 1 [8 BYTE]	Axis-1
	32	64	128	In/Out. 2 [8 BYTE]	Axis-2
	34	68	136	In/Out. 3 [8 BYTE]	Axis-3
	36	72	144	In/Out. 4 [8 BYTE]	Axis-4
	38	76	152	In/Out. 5 [8 BYTE]	Axis-5
	40	80	160	In/Out. 6 [8 BYTE]	Axis-6
	42	84	168	In/Out. 7 [8 BYTE]	Axis-7
	44	88	176	In/Out. 8 [8 BYTE]	Axis-8

■ PLC PROFIBUS Master Module data exchange start command

PROFIBUS master module of Mitzubishi PLC exists with the bit, which determines whether to exchange the data of the PROFIBUS network. In addition, there is a bit which enables verification of the data exchange status.

This example is to be executed under the condition that this function will be executed continuously. In addition, this is the command in case the PROFIBUS master module QJ71PB92V is inserted into PLC slot 0. (Refer to Example 5.1 system configurations).

The device no. beginning with X indicates the input signal of PCPU at QJ71PB92V and the device no. beginning with Y indicates the output signal of QCPU at QJ71PB92V. In addition, SM400 is the special relay of Mitzubishi PLC which always maintains the status of 'ON', so this becomes the command that executes the command to start data exchange of PROFIBUS after booting the PLC for the first time.

Example 1. PROFIBUS Network Data Exchange Approval Program

※ When the leading I/O address is 000

① The start address of input device : X0

② The start address of output device : Y0

NOTE: Example 1 is PROFIBUS network data exchange start command and if Y0 bit is not ON, it is not possible to communicate with the equipment of all slaves.

■ CONNECT

CONNECT command is used when determining the use of the corresponding axis. Example 2 is the example for CONNECT command of Axis-0 and Axis-1.

Example 2. Verify the ENABLE Command and Response Bit of each axis

✓ **Address of control Bit map**

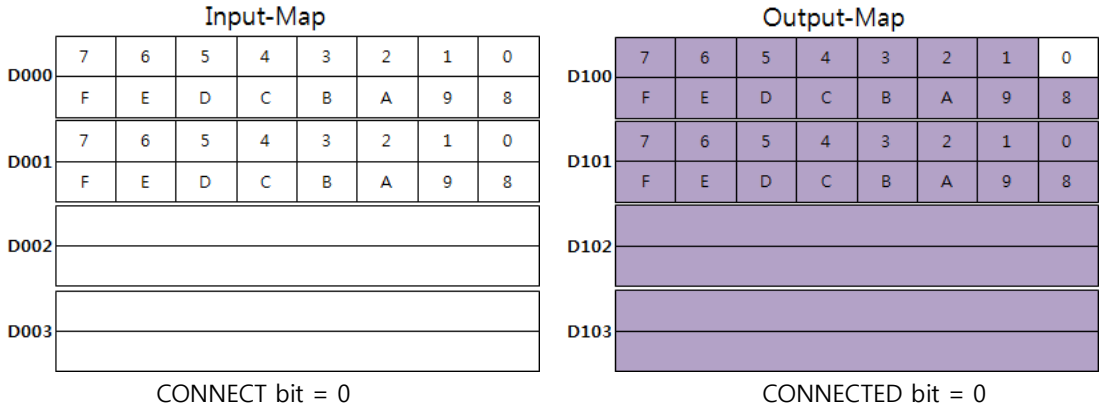
- **Input-Map**
  CONNECT – D000
- **Output-Map**
  CONNECTED – D100

✓ **IO Information**

- **Input signal**
  CONNECT - X500
- **Output signal**
  CONNECT RESP - Y600

✓ **IO-Map Command and Response type**

- **Before executing CONNECT Command**



CONNECT bit = 0 CONNECTED bit = 0

- **After executing CONNECT Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

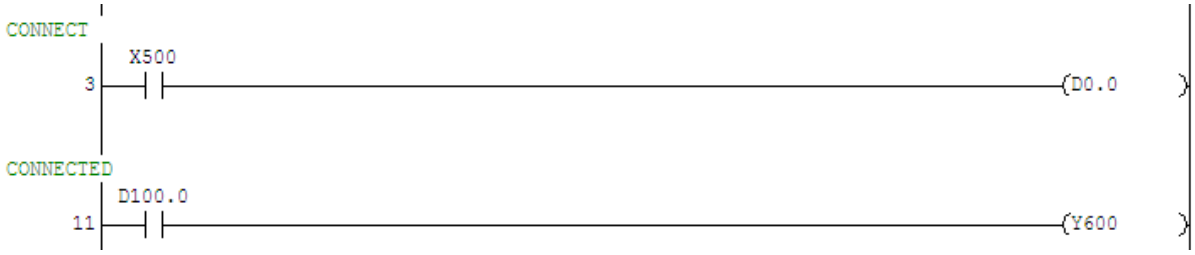
CONNECT bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

CONNECTED bit = 1

LADDER



NOTE: Example 2 is the basic example included in the example after Axis-0 and the later example can be executed in the state that this command is executed.

✓ **Command sequence**

① With X500 input, set CONNECT Bit (D0.0) of Axis-0.

② When Axis-0 connection is normal, the response data shall be output.

③ The response status for the command using Axis-0 shall be verified by the output to Y600.

④ If not connected, the bit of all 4WORD data register except for bit=0 of D000 is set as '1'.

⚠ **CAUTION**	The status information of the motor drive, command response, and all information of response data should include the condition that **CONNECTED Bit** [**Output-Map 0:0**] is '1'.

■ ENABLE Command and E-STOP Command

ENABLE Command operates in the state where E-STOP command is inactivated. Example 3 is the example for Motor ENABLE command and E-STOP command of Axis-0.

Example 3. Motor ENABLE Command and E-STOP Command

✓ **Address of Control Bit Map**

- **Input-Map**
  ENABLE – D000.1
  E-STOP – D002
- **Output-Map**
  ENABLED – D100.1
  E-STOP_RESP – D100.2

✓ **IO Information**

- **Input signal**
  ENABLE - X501
  E-STOP - X502
- **Output signal**
  ENABLE RESP - Y601
  E-STOP LoopBack - Y602

✓ **IO-Map Command and Response Type**

- **Execute ENABLE Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

ENABLE bit = 1
E-STOP bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

ENABLED bit = 1
E-STOP RESP bit = 0

- **Execute E-STOP Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	F	E	D	C	B	A	9	8
D102								
D103								

ENABLE bit = 1

E-STOP bit = 0

ENABLED bit = 0

E-STOP RESP bit = 1

✓ **LADDER**

NOTE: The ladder of Example 3 is the Command for one axis (Axis-0). This example will be included in a later example.

✓ **Command sequence**

① Motor ENABLE Command sets ENABLE Bit (Y1) by X501 input.

② When motor is activated, this shall be output to Y601 in the state of ENABLED Bit (X1001).

③ Control /E-STOP Bit with X502 N/C input. If X502 input is Closed, E-STOPED Bit(X1002) is inactive and, in this case, even if ENABLE Command is executed by X501, ENABLE Command will not operate but E-STOPED bit (D100.2) will be active. In addition, all motion control Command enables command control in the state where /E-STOP Command is activated.

■ ALARM Status Verification

Alarm status can be verified by ALM/ERR bit. Example 4 is the example for alarm status verification method and alarm reset of Axis-0.

Example 4. Status verification and Alarm Reset Command

✓ **Address of Control Bit Map**

- **Input-Map**

  ENABLE – D000.1

  E-STOP – D000.2

  ALARM_RESET – D000.3

- **Output-Map**

  ENABLED – D100.1

  E-STOP_RESP – D100.2

  ALARM_ERROR – D100.3

✓ **IO Information**

- **Input signal**

  ALM_RST – X503

- **Output signal**

  ALM_STAT – Y603

✓ **IO-Map Command and Response Type**

- **When alarm occurs**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

ALARM RESET bit = 0

ENABLE bit = 1

E-STOP bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

ALARM bit = 1

ENABLED bit = 0

E-STOP RESP bit = 0

- **Execute Alarm Reset Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

ALARM RESET bit = 1

ENABLE bit = 1

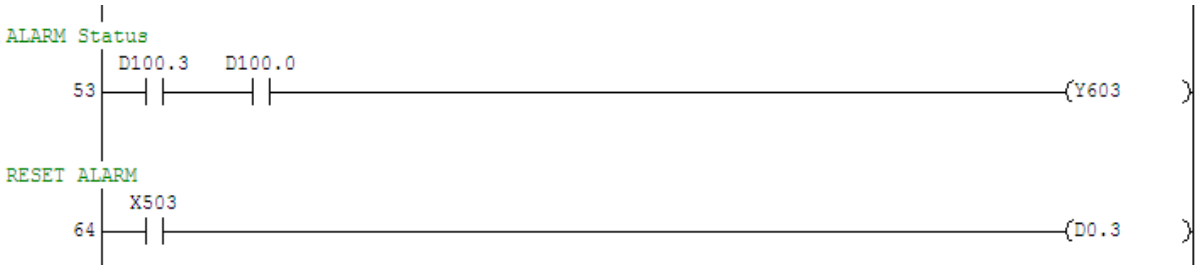
E-STOP bit = 1

ALARM bit = 0

ENABLED bit = 0

E-STOP RESP bit = 0

✓ **LADDER**



NOTE: Tha ladder of Example 4 is the added command to Example 3 and Hand Shake and CONNECT, ENABLE, and E-STOP Command were omitted.

✓ **Command sequence**

① Alarm status shall be output to Y603 with ALM/ERR Bit(D100.3) status.

② The occurred alarm can be reset by entering Close of X503.

③ If alarm occurrs, the motor should be inactivated and ENABLE Bit(D100.1) shall be on Open status.

■ CANCEL Command

CANCEL Command is used to stop Motion, HOLD Command, and PT RUN command. Example 5 is the example for CANCEL command of Axis-0.

Example 5. CANCEL Command

✓ **Address of Control Bit Map**

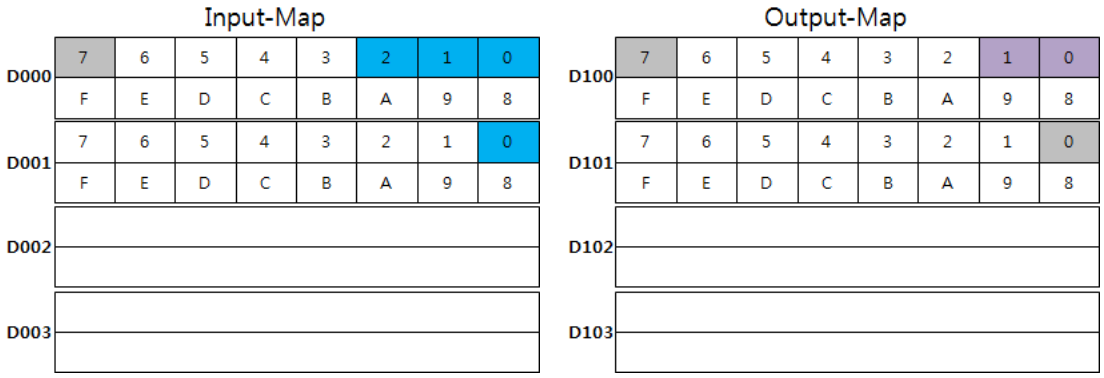
- **Input-Map**
  MOTION/SETTING – D000.7
  CANCEL – D000.A
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  MOTIONING – D100.A

✓ **IO Information**

- **Input signal**
  CANCEL – X504
- **Output signal**
  MOTIONING – Y604

✓ **IO-Map Command and Response Type**

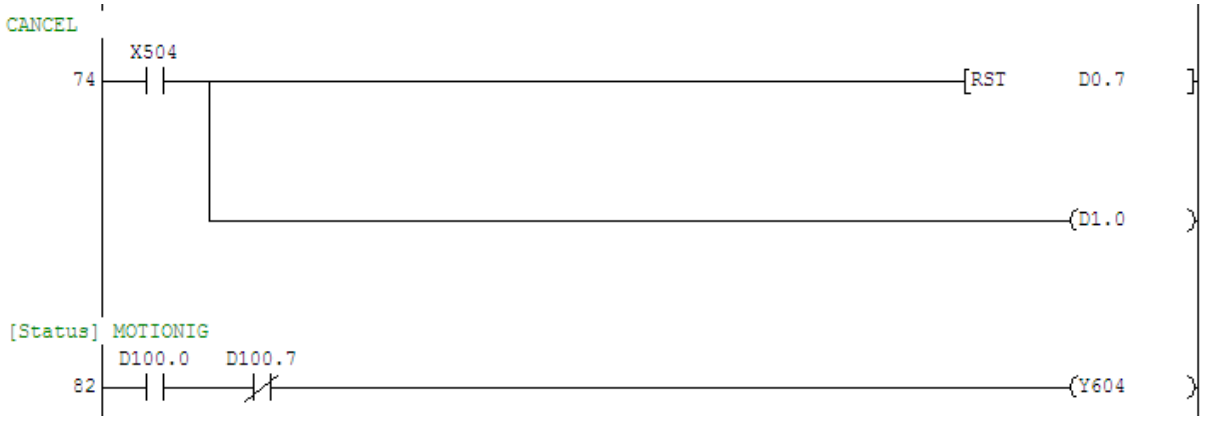
- **Execute CANCEL Command**



MOTION/SETTING bit = 0
CANCEL bit = 1

MOTION/SETTING_RESP bit = 0
MOTIONING bit = 0

✓ **LADDER**



NOTE: The ladder of Example 5 is the added command to Example 4 and the contents of the previous example were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING(Y0007) Bit with X504 input and change the IO-Map into the Motion Mode status.

② CANCEL Command shall be applied when CANCEL Bit (D000A) is ON regardless of the value of CMD_CODE.

③ When the motion of Axis-0 is running, MOTIONING Bit (D100A) shall be in Close status and outputted to Y604. However, when cancelling through X504, MOTIONING Bit (D100A) shall be in Open status.

* If CANCEL Command was entered during PT RUN, PT RUN will stop.

■ HOLD Command

HOLD Command is the command to stop MOTION Command temporarily and restart. Example 6 is an example of HOLD command of Axis – 0.

Example 6. HOLD command of Axis - 0

✓ **Address of Control Bit Map**

- **Input-Map**
  MOTION/SETTING – D000.7
  HOLD – D00.B
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  MOTIONING – D100.A
  HOLD_RESP – D100.B

✓ **IO Information**

- **Input signal**
  HOLD – X505
- **Output signal**
  MOTIONING – Y604
  HOLD Resp – Y605

✓ **IO-Map Command and Response Type**

- **Execute HOLD Command to stop motion temporarily**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
	7	6	5	4	3	2	1	0
D001	F	E	D	C	B	A	9	8
D002								
D003								

MOTION/SETTING bit = 0
HOLD bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
	7	6	5	4	3	2	1	0
D101	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING_RESP bit = 0
HOLD_RESP bit = 1
MOTIONING bit = 0

- **Reset HOLD Command to restart the motion**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

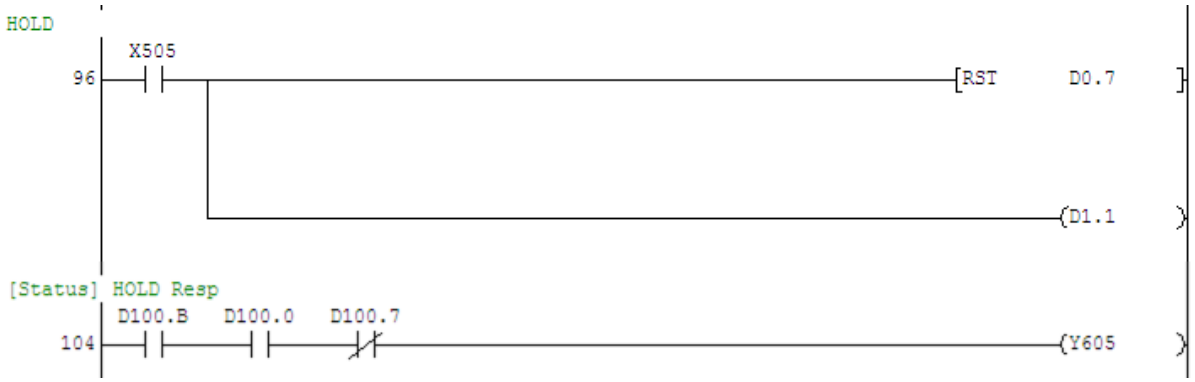
HOLD bit = 0

MOTION/SETTING_RESP bit = 0

HOLD_RESP bit = 0

MOTIONING bit = 1

✓ **LADDER**



NOTE: The ladder of Example 6 is the added command to Example 5 and the contents of the previous example were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING(Y0007) Bit with X505 Close input and change the IO-Map to the motion Mode status.

② HOLD Command shall be applied when HOLD Bit (D000.B) is ON regardless of the value of CMD_CODE.

③ When HOLD Command is executed, if X505 is Open input, HOLD Bit (D000.B) shall be changed to OFF to restart the temporarily stopped motion.

④ If HOLD Command is executed, HOLD_RESP Bit (D100.B) shall be in Close status and output to Y605.

⑤ The operation status of HOLD Command can be verified by HOLD_RESP Bit (D100.B) in the state that MOTION/SETTING_RESP. Bit (D100.7) is Close, which receives from input buffer.

■ RESPONSE TYPE Setting

RESPONSE TYPE (response data setting) setting can be verified in the motion mode (MOTIONING). Example 7 is the example for RESPONSE TYPE setting method for Axis-0.

Example 7. Response Data Setting

✓ **Address of Control Bit Map**

- **Input-Map**
  MOTION/SETTING – D000.7
  RESPONSE_TYPE 0~3 – D000.C~D000.F
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  RESPONSE_TYPE_RESP 0~3 – D100.C~D100.F
  RESPONSE_DATA – D102~D103 (D102 [1 DWORD])

✓ **IO Information**

- **Input signal**
  Response Type 0~3
- **Output Data (DWORD)**
  Command Position – D2000
  Actual Position – D2002
  Position Error – D2004
  Actual Velocity – D2006
  Current PT No – D2008
  Current Alarm No – D2010

✓ IO-Map Command and Response Type

- Not request the Response Data

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

MOTION/SETTING bit = 0

RESPONSE_TYPE 0~3 = 0000b

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING_RESP bit = 0

RESPONSE_TYPE 0~3 = 0000b

RESPONSE_DATA = 0

- Request the Command Position

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

MOTION/SETTING bit = 0

RESPONSE_TYPE 0~3 = 0001b

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING_RESP bit = 0

RESPONSE_TYPE 0~3 = 0001b

RESPONSE_DATA = Command Position

- Request the Actual Position

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

MOTION/SETTING bit = 0

RESPONSE_TYPE 0~3 = 0010b

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING_RESP bit = 0

RESPONSE_TYPE 0~3 = 0010b

RESPONSE_DATA = Actual Position

- **Request the Position Error**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

RESPONSE_TYPE 0~3 = 0011b

MOTION/SETTING_RESP bit = 0

RESPONSE_TYPE 0~3 = 0011b

RESPONSE_DATA = Position Error

- **Request the Actual Velocity**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

RESPONSE_TYPE 0~3 = 0101b

MOTION/SETTING_RESP bit = 0

RESPONSE_TYPE 0~3 = 0101b

RESPONSE_DATA = Actual Velocity

- **Request the Current PT No**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

RESPONSE_TYPE 0~3 = 0101b

MOTION/SETTING_RESP bit = 0

RESPONSE_TYPE 0~3 = 0101b

RESPONSE_DATA = Current PT No.

- **Request the Current Alarm Info.**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

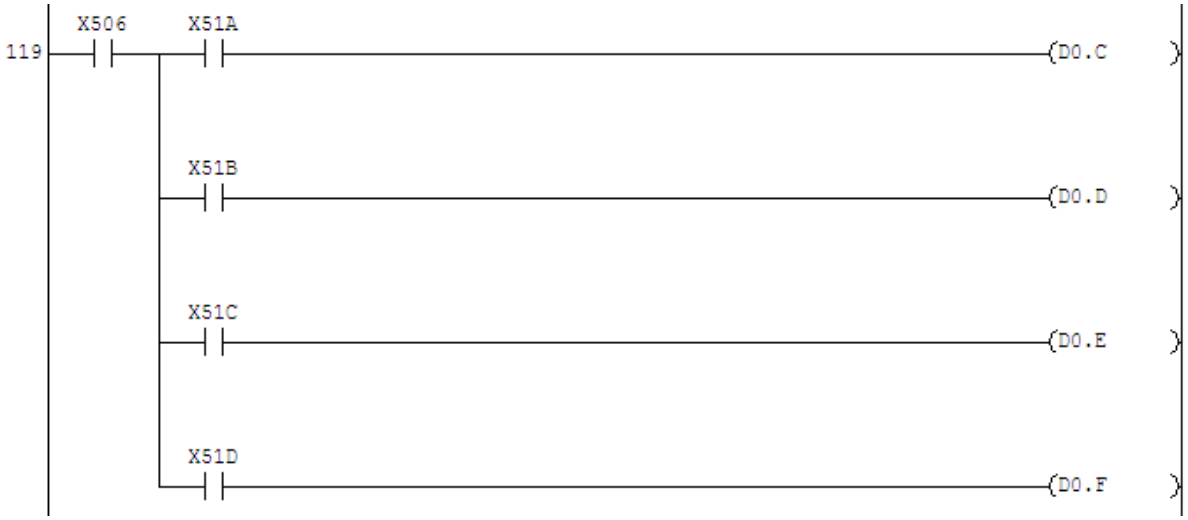
RESPONSE_TYPE 0~3 = 0100b

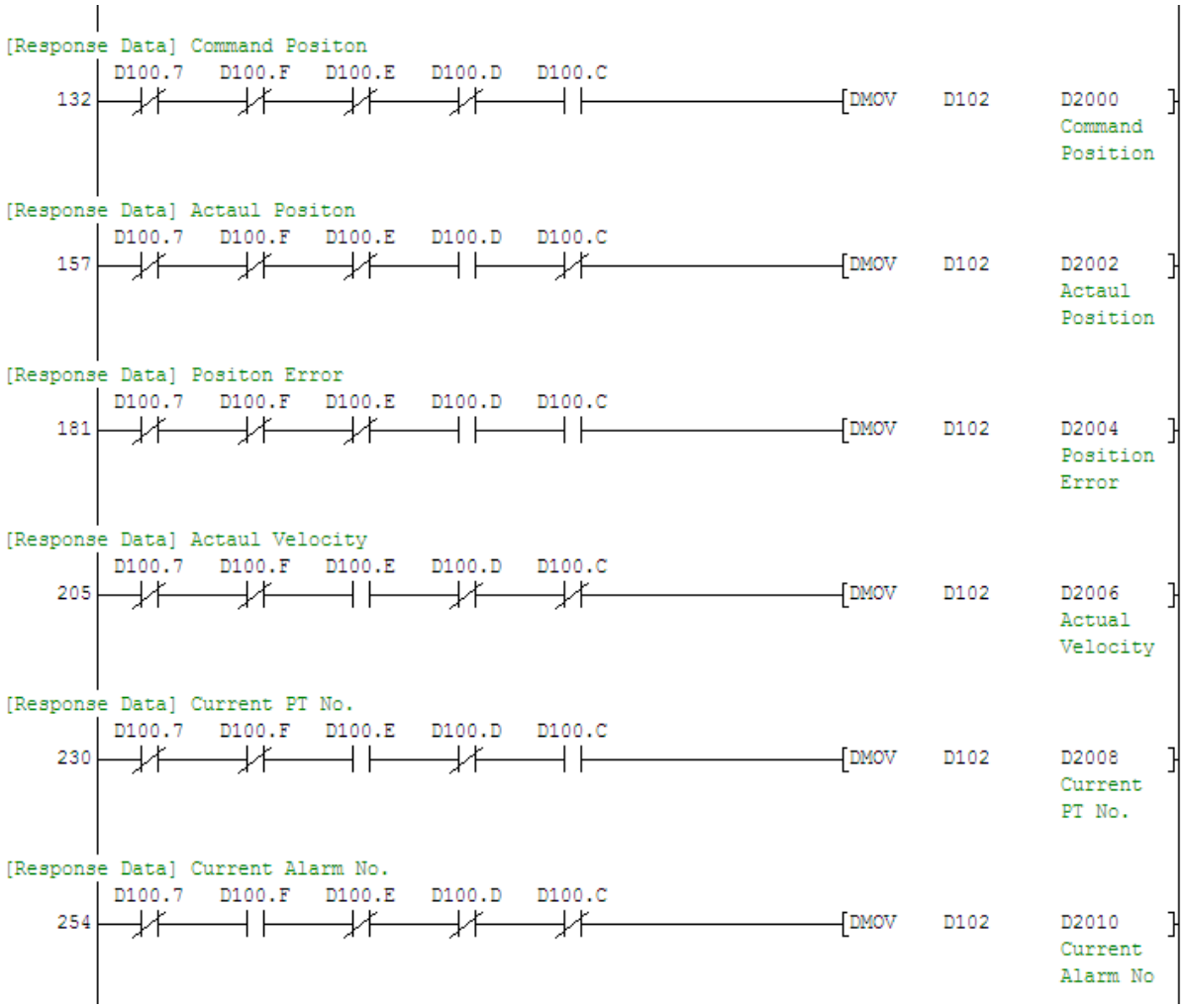
MOTION/SETTING_RESP bit = 0

RESPONSE_TYPE 0~3 = 0100b

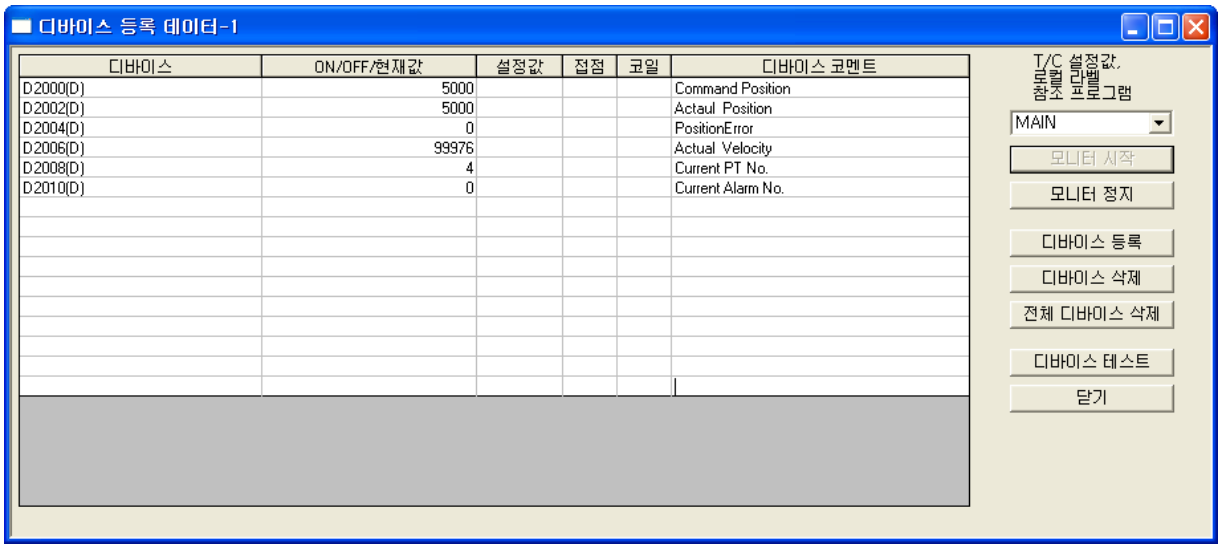
RESPONSE_DATA = Current Alarm Info.

✓ LADDER





NOTE: The ladder of Example 7 is the added command to Example 6 and the contents of the previous example were omitted.



NOTE: This is the result of monitoring the response data by the command in Example 7.

✓ **Command sequence**

① Clear MOTION/SETTING(D0007) Bit with X506 input and change the IO-Map to motion Mode status.

② Set the code for the desired data to request in RESPONSE_TYPE Area (D000.C~D00.F). (Example 7 is the command that sets the response data code according to the input value of X51A~X51D and save each Response Data in D2000~D20010.)

③ In the state that MOTION/SETTING_RESP. Bit (D100.7) is Close, if the RESPONSE_TPYE_RESP. Area (D100.C~D100.F) value is the same as the requested Response Data code, the value of received data area (D100) of Axis-0 shall be classified by the requested response data.

NOTE: The device registration data of Example 7 is the data obtained by changing the response data type in sequence. This is the data which obtained the tracking position value, actual value, position error, operation speed, and PT No. in sequence in the state of being changed from PT No.3 to No.4.

■ Status Information Verification

The status information verification can be verified in the motion mode (MOTIONING) status. Example 8 is the example of the status information verification method of Axis-0.

Example 8. Response Data Setting

✓ READY Bit : ON when IO-Map Command is available.

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ Out Range Bit : ON when IO-Map Command exceeds the data range.

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ MOTIONING Bit : ON when the motor is running.

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ HOLD RESP. Bit : ON when changed to HOLD status during operation.

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ PT RUNNING Bit : ON when PT is running.

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ DIR Bit : ON when the rotation direction of the motor is normal (CW).

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ INP Bit : ON when In position is completed.

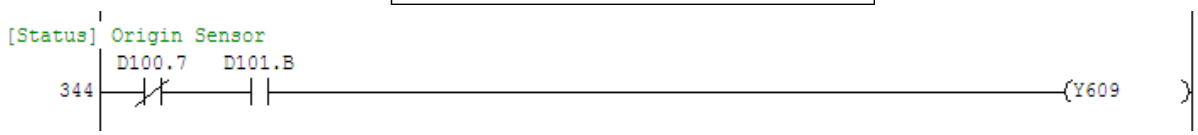
Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ ORIGIN_SENSOR Bit : ON when the Origin Sensor is ON.

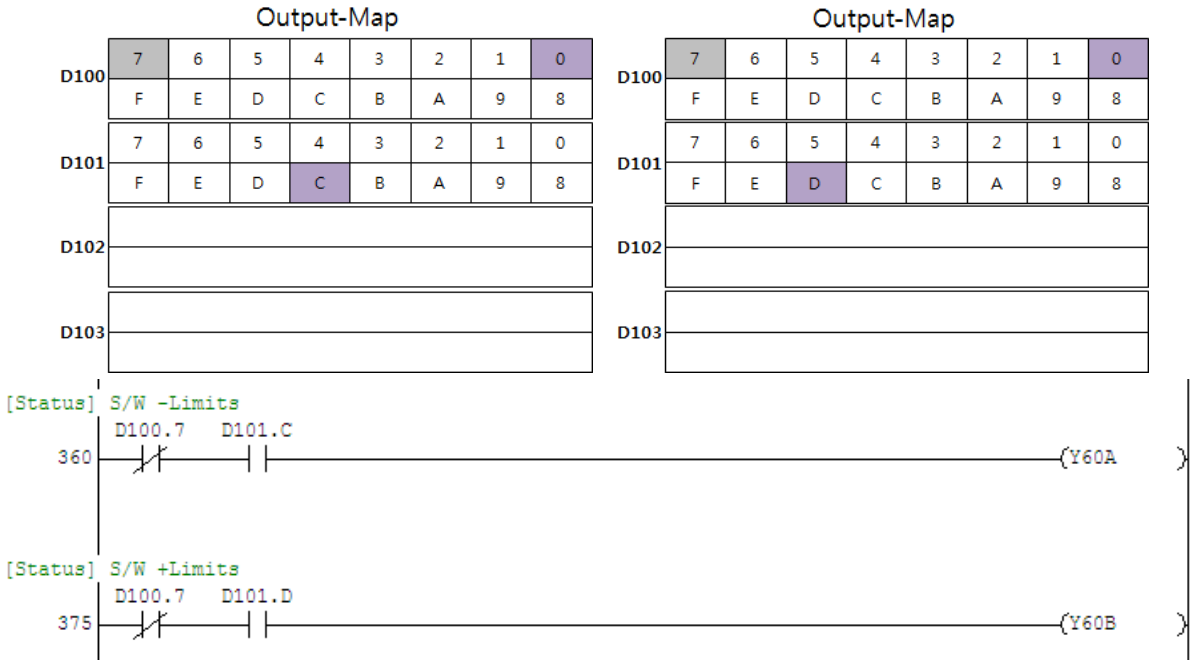
Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								



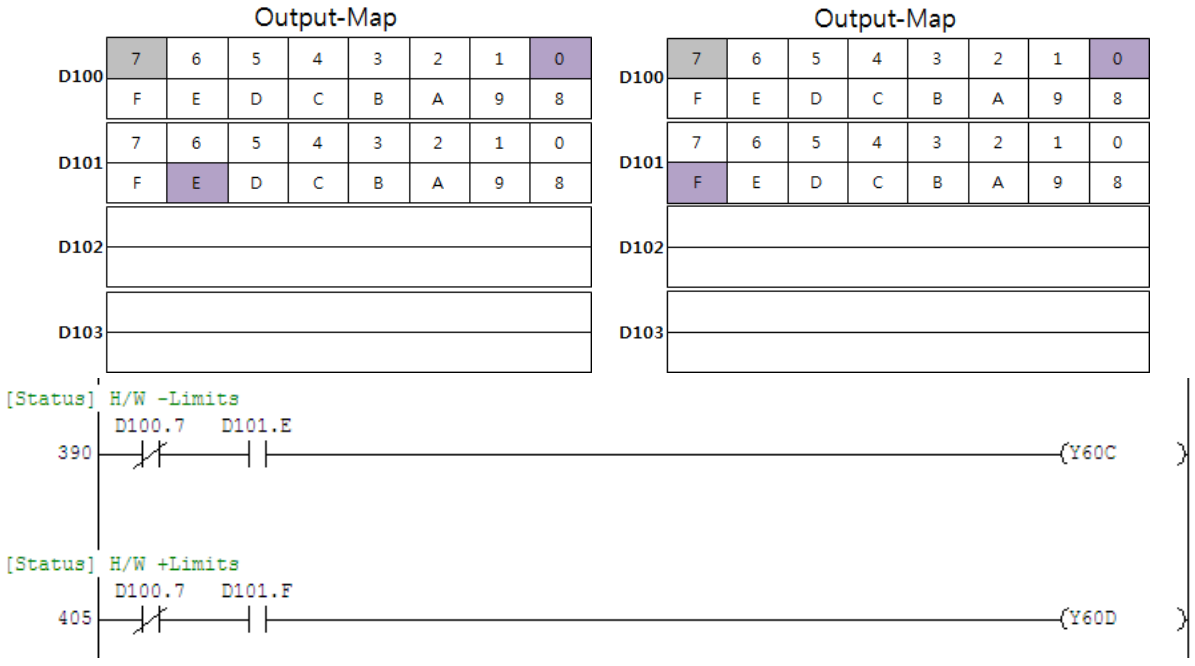
✓ S/W -LIMIT Bit : ON when the exceeding – direction program limit.

✓ S/W +LIMIT Bit : Bit : ON when exceeding the + direction program limit.



✓ H/W -LIMIT Bit : ON when – direction limit sensor is ON.

✓ H/W +LIMIT Bit : ON when + direction limit sensor is ON.



NOTE: The status information verification is available when IO-Map is in MOTION mode.

■ CMD START Command

CMD START command is used by executing the command in MOTION mode of IO-Map (MOTION/SETTING = 0) such as Position Move, PT Run, Origin Search, etc and the SETTING mode (MOTION/SETTING = 1). This command is used by forming the PLC circuit of Example 9 and Example 10.

Example 9. How to run CMD START command of Motion Mode

✓ **IO-Map Command and Response Type**

- **Command and response in Motion Mode**

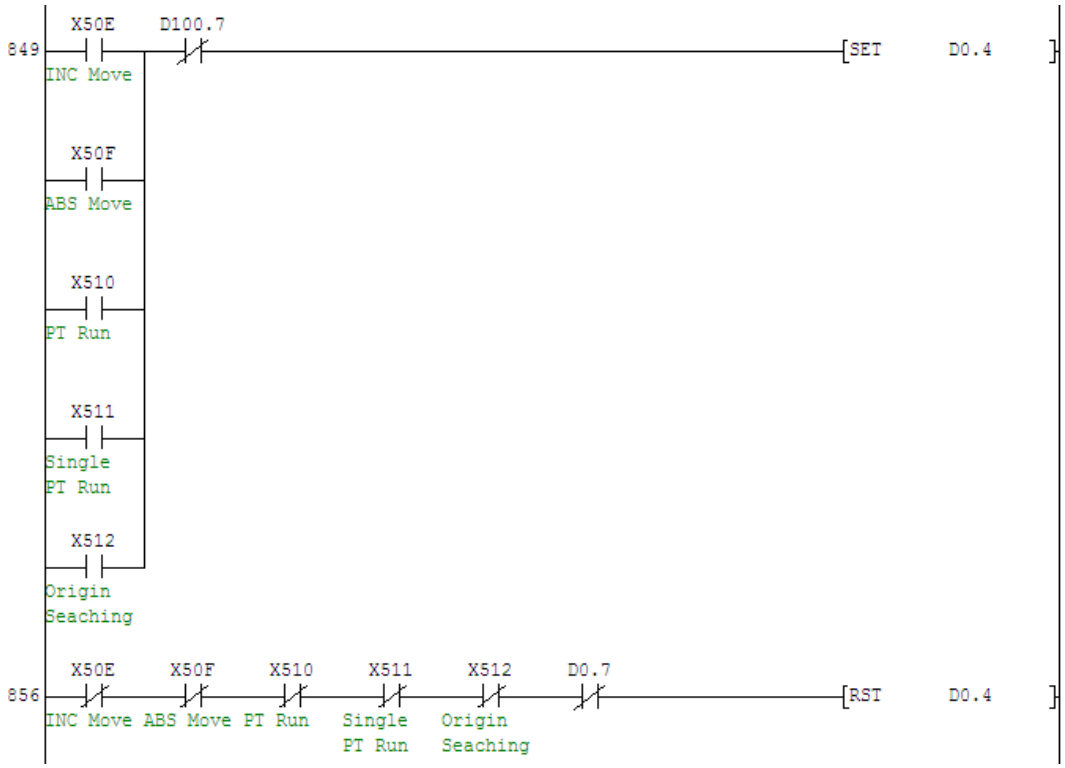
Input-Map

	7	6	5	4	3	2	1	0
D000	15	14	13	12	11	10	9	8
D001	7	6	5	4	3	2	1	0
	15	14	13	12	11	10	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	15	14	13	12	11	10	9	8
D101	7	6	5	4	3	2	1	0
	15	14	13	12	11	10	9	8
D102								
D103								

✓ **LADDER**



NOTE : The ladder of Example 9 is the added command to Example 15, 16, 18, 19, 21 to execute the corresponding command.

✓ **Command sequence**

① D000.7 Bit of the changed Remote input by the selection of an open input signal and command of the corresponding command sets the value of NC status and CMD_START Bit (D000.4) by the signal configured with AND circuit.

② When the input of the corresponding command is Close, reset CMD_START Bit (D000.4).

Example 10. How to run CMD START command of SETTING mode

✓ **IO-Map Command and Response Type**

- **Command and Response in Motion Mode**

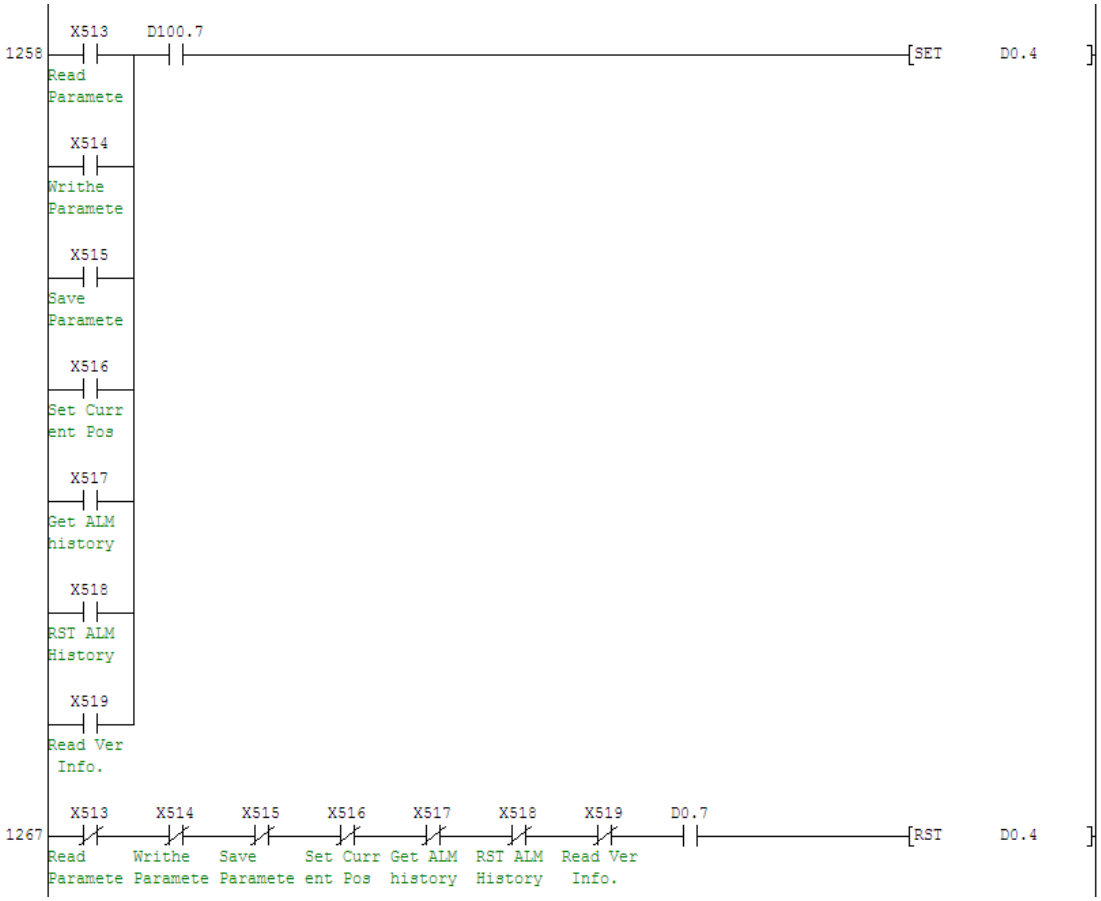
Input-Map

	7	6	5	4	3	2	1	0
D000	15	14	13	12	11	10	9	8
D001	7	6	5	4	3	2	1	0
	15	14	13	12	11	10	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	15	14	13	12	11	10	9	8
D101	7	6	5	4	3	2	1	0
	15	14	13	12	11	10	9	8
D102								
D103								

✓ **LADDER**



NOTE : The ladder of Example 10 is the added command to Example 22~28 to execute the corresponding command.

✓ **Command sequence**

① D000.7 Bit of the changed Remote input by the selection of open input signal and command of the corresponding command sets the value of ON status and CMD_START Bit (D000.4) by the signal configured with AND circuit.

② When the input of the corresponding command is Close, reset CMD_START Bit (D000.4).

5.2.1 JOG Move Command

JOG MOVE operates the command code (CMD_CODE) '0' in the MOTION mode (MOTIONING). JOG MOVE command response for Speed Step Move or Speed Ratio Move and Speed Value, shall be verified by JOG_Resp. Bit.

■ JOG Move – Speed Step Move or Speed Ratio Move

Speed Step Move and Speed Ratio Move of JOG Move have the same operation command method. This operation method shall be selected by setting the value of parameter PN#0104『Use Jog Speed Ratio』.

Speed Step Move of JOG MOVE is the motion of JOG MOVE with the saved speed level of 0~3.

Speed Ratio Move of JOG MOVE operates with the ratio of saved parameter PN#0105『Move Speed for Jog Move: Ratio』.

Example 11. JOG Move command of Speed Step Move or Speed Ratio Move type

✓ **Address of Control Bit Map**

- **Input-Map**

  MOTION/SETTING – D000.7
  CMD_CODE – D0008~D000.C
  SPD.MODE – D001.A
  -JOG – D000.E
  +JOG – D000.F
  Command Data Area – D002~D003 (D002 [1 DWORD])

- **Output-Map**

  MOTION/SETTING_RESP – D100. 7
  CMD_CODE_RESP – D100.8~D100.B
  JOG_RESP – D101.5

✓ **IO Information**

- **Input information**

  JOG- : X507
  JOG+ : X508
  JOG Speed Step No. (Input range : 0~3 [DWORD])
  JOG Speed Ratio Value (Input range : 1~255 [DWORD])

- **Output information**

  MOTIONING – Y604
  JOG Resp – Y610

✓ IO-Map Command and Response Type

- Run -JOG Command

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

CMD_CODE = 0000b , SPD_MODE bit = 0;

+JOG bit = 0, -JOG bit = 1

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

JOG_RESP bit = 1, MOTIONING bit = 1

- Run +JOG Command

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

CMD_CODE = 0000b , SPD_MODE bit = 0;

+JOG bit = 1, -JOG bit = 0

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

JOG_RESP bit = 1, MOTIONING bit = 1

- When -JOG and +JOG Bit is '0'

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

CMD_CODE = 0000b , SPD_MODE bit = 0;

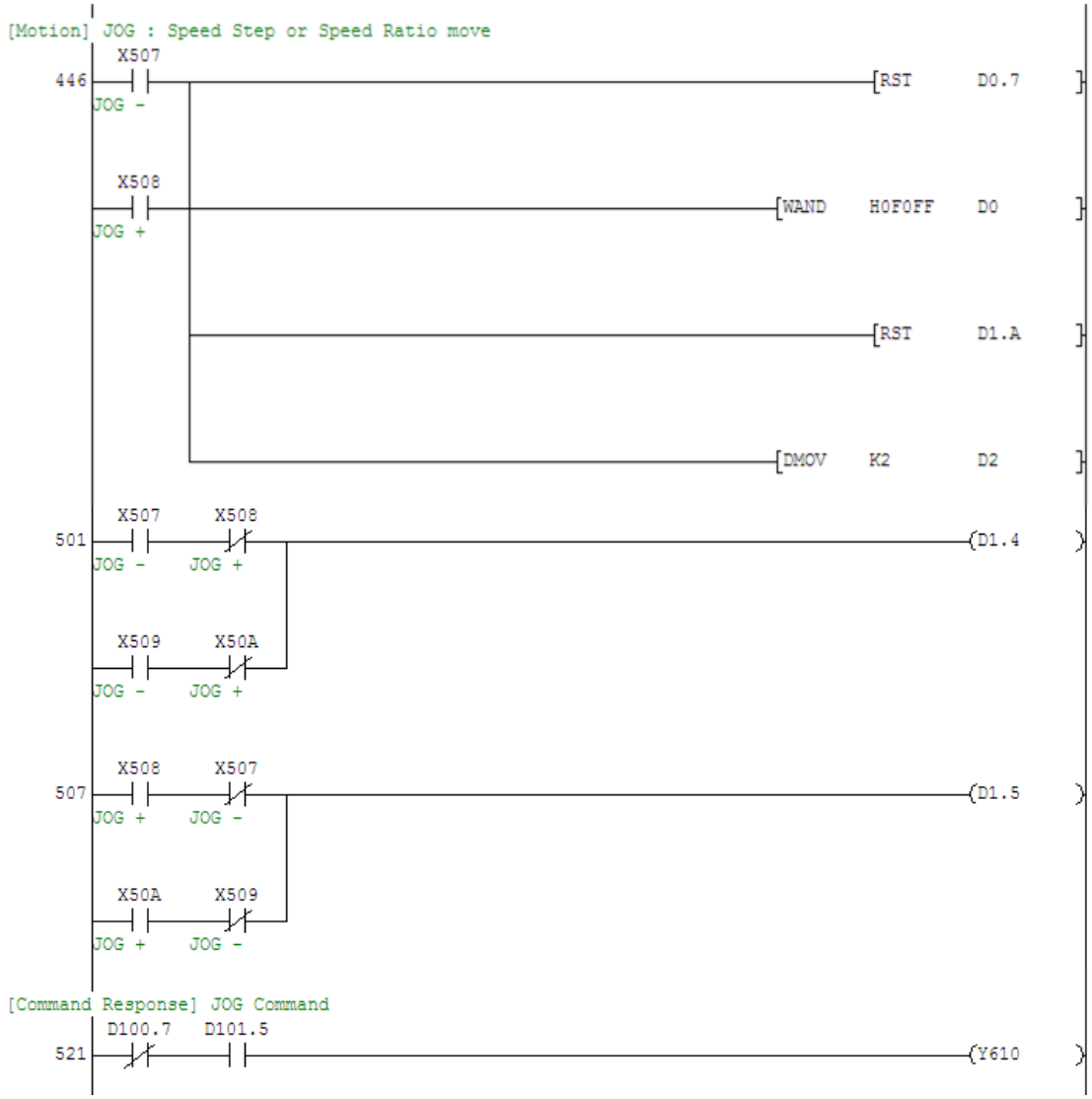
+JOG bit = 0, -JOG bit = 0

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

JOG_RESP bit = 0, MOTIONING bit = 0

✓ **LADDER**



NOTE 1: The ladder of Example 11 is the added to Example 7 and the contents of the previous example were omitted.

NOTE 2: When Parameter PN#0104 『Use Jog Speed Ratio』 value is '1', if Example 11 is executed in Speed Ratio Move Mode, it shall operate with the speed of 2% of PN#0105 『Move Speed for Jog Move: Ratio』 value.

NOTE 3: This example includes the command input of Example 12.

✓ **Command sequence**

① Clear MOTION/SETTING(Y0007) Bit with Close input of X507 or X508 and change the IO-Map to motion Mode status.

② Enter command code '0' into CMD_CODE Area (D000.8~D000.B).

③ Clear SPD_MODE Bit (D001.A) as '0'.

④ Enter Speed Step no. into Data Area (D002) of Axis-0.

(For Example 11, the ladder is the one that entered speed step no.2 for 'S' of DMOV Command in D002 Area.)

⑤ Run the command when -JOGBit(D001.4) or +JOG Bit(D001.5) is ON.

⑥ When X507 or X508 input is Open, JOG Move will stop.

⑦ The response for JOG Move Command shall be verified by forming with NC input of MOTION/SETTING_RESP. Bit(D100.7) and AND circuit of JOG_Resp. Bit(D101.5).

■ JOG Move – Speed Value Move

Speed Value Move of JOG MOVE is the motion for JOG MOVE by applying the input value to the actual speed. Example 12 is the example for Speed Value Move of JOG MOVE of Axis-0.

Example 12. JOG Move Command of Speed Value Move type

✓ **Control Bit Map information**

- **Input-Map**

  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  SPD.MODE – D001.A
  -JOG – D001.4
  +JOG – D001.5
  Command Data Area – D002~D002 (D002 [1 DWORD])

- **Output-Map**

  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  JOG_RESP – D101.5

✓ **IO Information**

- **Input information**

  JOG- : X509
  JOG+ : X50A
  JOG Speed Value (Input range : 1~500,000 pps [DWORD])

- **Output information**

  MOTIONING – Y604
  JOG Resp – Y610

✓ IO-Map Command and Response Type

- Run -JOG Command

Input-Map

	7	6	5	4	3	2	1	0
Y0000	F	E	D	C	B	A	9	8
Y0010	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D0000								
D0001								

Output-Map

	7	6	5	4	3	2	1	0
X1000	F	E	D	C	B	A	9	8
X1010	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D1000								
D1001								

MOTION/SETTING bit = 0

CMD_CODE = 0000b , SPD_MODE bit = 1;

+JOG bit = 0, -JOG bit = 1

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

JOG_RESP bit = 1, MOTIONING bit = 1

- Run +JOG Command

Input-Map

	7	6	5	4	3	2	1	0
Y0000	F	E	D	C	B	A	9	8
Y0010	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D0000								
D0001								

Output-Map

	7	6	5	4	3	2	1	0
X1000	F	E	D	C	B	A	9	8
X1010	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D1000								
D1001								

MOTION/SETTING bit = 0

CMD_CODE = 0000b , SPD_MODE bit = 1;

+JOG bit = 1, -JOG bit = 0

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

JOG_RESP bit = 1, MOTIONING bit = 1

- When –JOG and, +JOG bit is ‘0’

Input-Map

	7	6	5	4	3	2	1	0
Y0000	F	E	D	C	B	A	9	8
Y0010	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D0000								
D0001								

Output-Map

	7	6	5	4	3	2	1	0
X1000	F	E	D	C	B	A	9	8
X1010	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D1000								
D1001								

MOTION/SETTING bit = 0

CMD_CODE = 0000b , SPD_MODE bit = 1;

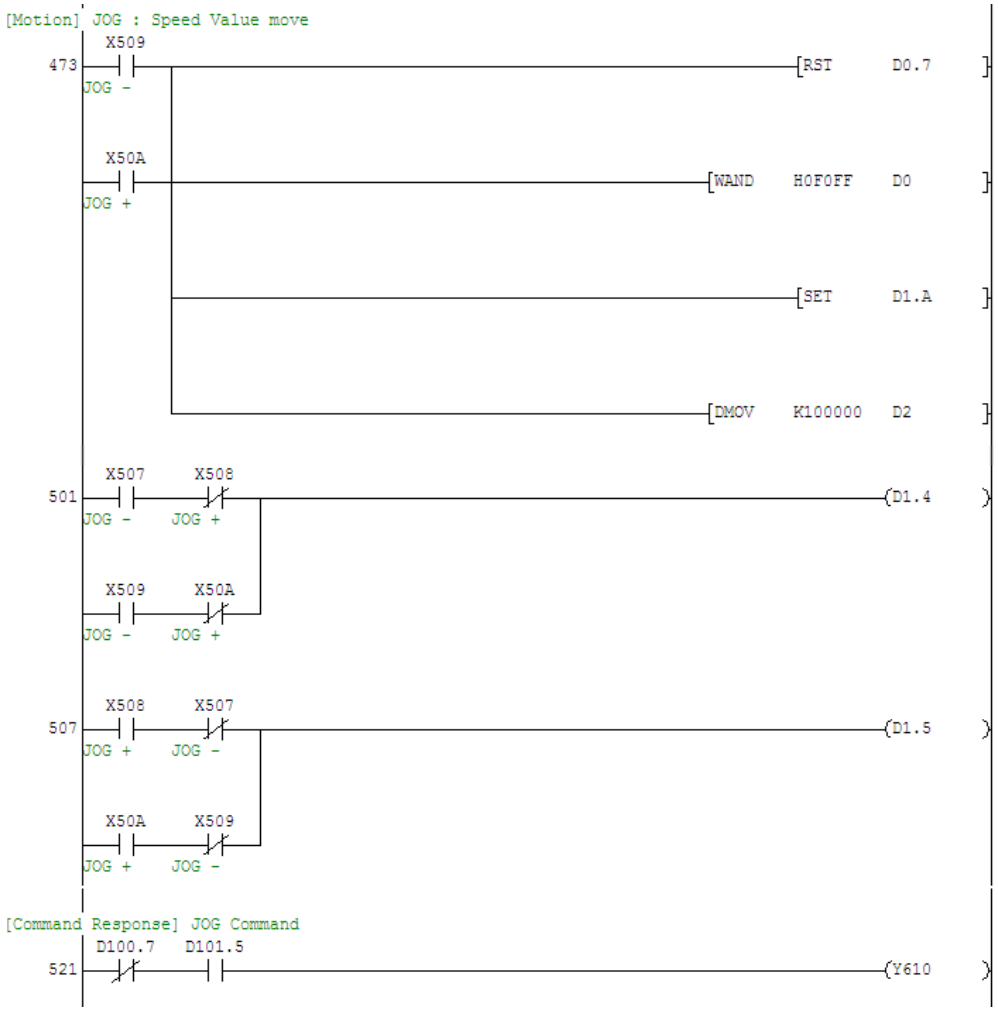
+JOG bit = 0, -JOG bit = 0

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

JOG_RESP bit = 0, MOTIONING bit = 0

✓ **LADDER**



NOTE 1: The ladder of Example 12 is the added command to Example 11 and the contents of the previous example were omitted.

NOTE 2: This example includes the command input from Example 11.

✓ **Command sequence**

① Clear MOTION/SETTING(D000.7) Bit with Close input of X509 or X50A and change the IO-Map to motion Mode status.

② Enter command code 0' into CMD_CODE Area (D000.8~D000.B).

③ Set SPD_MODE Bit (D001.A) as '1'.

④ Enter JOG Move speed value to Data Area(D002) of Axis-0.
(For Example 12, the ladder is the one that entered 50000pps of JOG Move speed for 'S' of DMOV Command in D002 Area.)

⑤ Run the command when -JOG Bit (D001.4) is ON.

⑥ If X509 or X50A input is Open, JOG Move will stop.

⑦ The response for JOG Move Command can be verified by NC input of MOTION/SETTING_RESP. Bit(D100.7) and AND circuit of JOG_Resp. Bit(D101.5).

5.2.2 Step Move Command

Step MOVE operates in Command code (CMD_CODE) '0' which is in MOTION mode status (MOTIONING) and moves by setting the value of step move distance no. 0~3. Example 13 is the example for Step Move of Axis-0.

Example 13. Step Move Command

✓ **Control Bit map information**

- **Input-Map**

  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  -STEP – D001.6
  +STEP – D001.7
  Command Data Area – D002~D003 (D002 [1 DWORD])

- **Output-Map**

  MOTION/SETTING_RESP – D100.7
  MOTIONING – D101.0
  STEP_RESP – D101.7

✓ **IO Information**

- **Input information**

  STEP- – X50B
  STEP+ – X50C
  STEP Step Distance No. (Input range : 0~3 [DWORD Type])

- **Output information**

  MOTIONING – Y604
  Step Resp – Y611

✓ IO-Map Command and Response Type

- Run -STEP Move Command

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

CMD_CODE = 0000b

+STEP bit = 0, -STEP bit = 1

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

STEP_RESP bit = 1, MOTIONING bit = 1

- Run + STEP Move Command

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

CMD_CODE = 0000b

+STEP bit = 1, -STEP bit = 0

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

STEP_RESP bit = 1, MOTIONING bit = 1

- When –STEP and +STEP Bit is ‘0’

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

CMD_CODE = 0000b

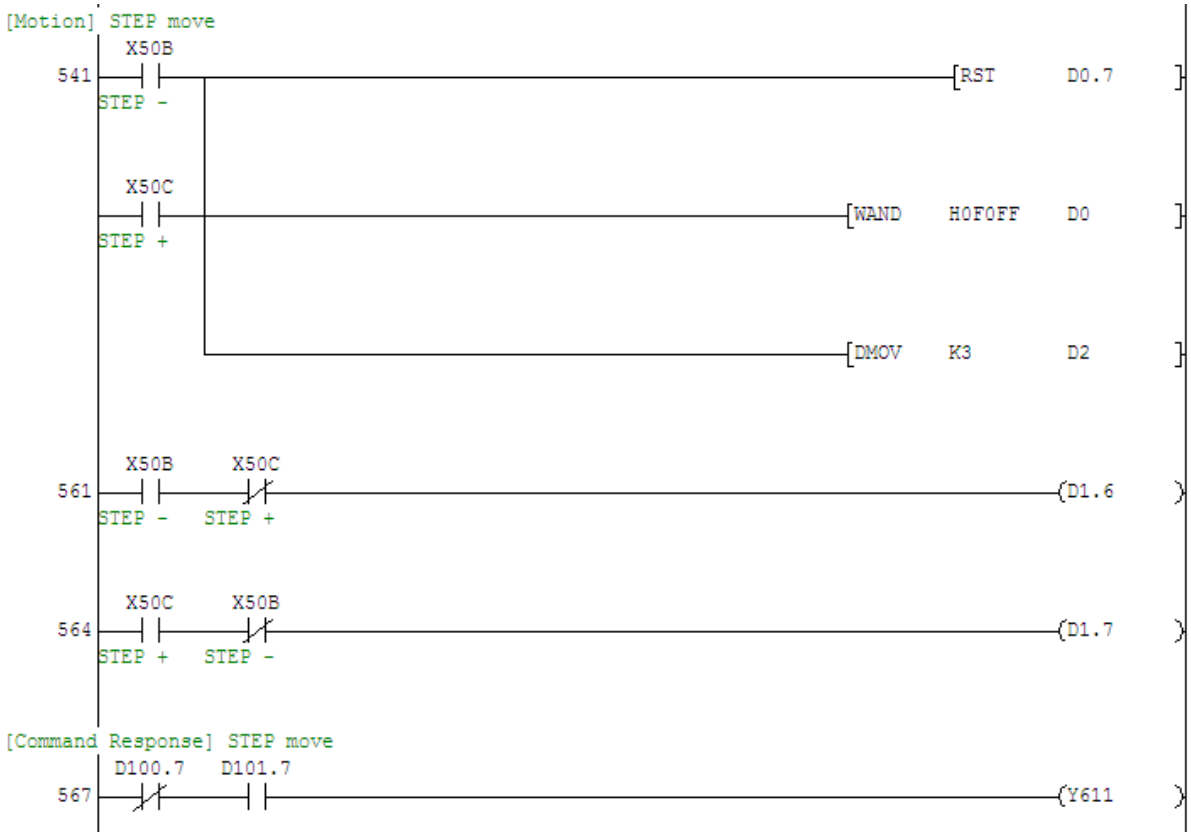
+STEP bit = 0, -STEP bit = 0

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

STEP_RESP bit = 0, MOTIONING bit = 0

✓ **LADDER**



NOTE 1: The ladder of Example 13 is the added command to Example 12 and the contents of the previous example were omitted.

NOTE 2: Step Move shall be executed when Command run Bit(-STEP, +STEP) is changed from OFF to ON, and if executed by ⊣↑⊢(pulse rise) Command, it will not operate because there is a difference between PLC step time and CC-Link scan time.

✓ **Command sequence**

① Clear MOTION/SETTING Bit(D000.7) with Close input of X50B or X50C and change the IO-Map to motion Mode status.

② Enter command code '0' into CMD_CODE Area (D000.8~D00.B).

③ Enter Step Distance No. Into Data Area(D002) of Axis-0.
(For Example 13, the ladder is the one that entered Step Distance No.3 for 'S' of DMOV Command into D002 Area.)

④ Run the command when +STEP Bit(D001.6) or -STEP Bit(D001.7) is ON.

⑤ The response for Step Move Command can be verified by NC input of MOTION/SETTING_RESP. Bit (D100.7) and AND circuit of JOG_Resp. Bit (D101.7).

5.2.3 Zero Position Move Command

Zero Position MOVE operates at command code (CMD_CODE) '0' which is in MOTION mode status (MOTIONING) and moves; the value of entered data (D002) shall be disregrded. Example 14 is the example for Zero position MOVE of Axis-0.

Example 14. Zero Position Move Command

✓ **Control Bit Map information**

- **Input-Map**

  MOTION/SETTING – D000.7

  CMD_CODE – D000.8~D000.B

  GO_ZERO_POS – D001.3

- **Output-Map**

  MOTION/SETTING_RESP – D100.7

  MOTIONING – D101.1

  GO_ZERO_POS_RESP – D101.3

✓ **IO Information**

- **Input information**

  Go Zero Position – X50D

- **Output information**

  MOTIONING – Y604

  Go Zero POS Resp – Y612

✓ **IO-Map Command and Response Type**

- **Run Zero Position Move Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

MOTION/SETTING bit = 0

CMD_CODE = 0000b

GO_ZERO_POS bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

GO_ZERO_POS_RESP bit = 1,

MOTIONING bit = 1

- **Even if GO_ZERO_POS Bit is released during Zero Position Move, the zero position MOVE status shall be maintained**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

MOTION/SETTING bit = 0

CMD_CODE = 0000b

RESPONSE_TYPE = 0001b

0GO_ZERO_POS bit = 0

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
	Response Data ≠ 0							
D103								

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

RESPONSE_TYPE_RESP = 0001b

GO_ZERO_POS_RESP bit = 1,

MOTIONING bit = 1

- **When setting GO_ZERO_POS bit at the zero position**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

MOTION/SETTING bit = 0

CMD_CODE = 0000b

RESPONSE_TYPE = 0001b

GO_ZERO_POS bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
	Response Data = 0							
D103								

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0000b

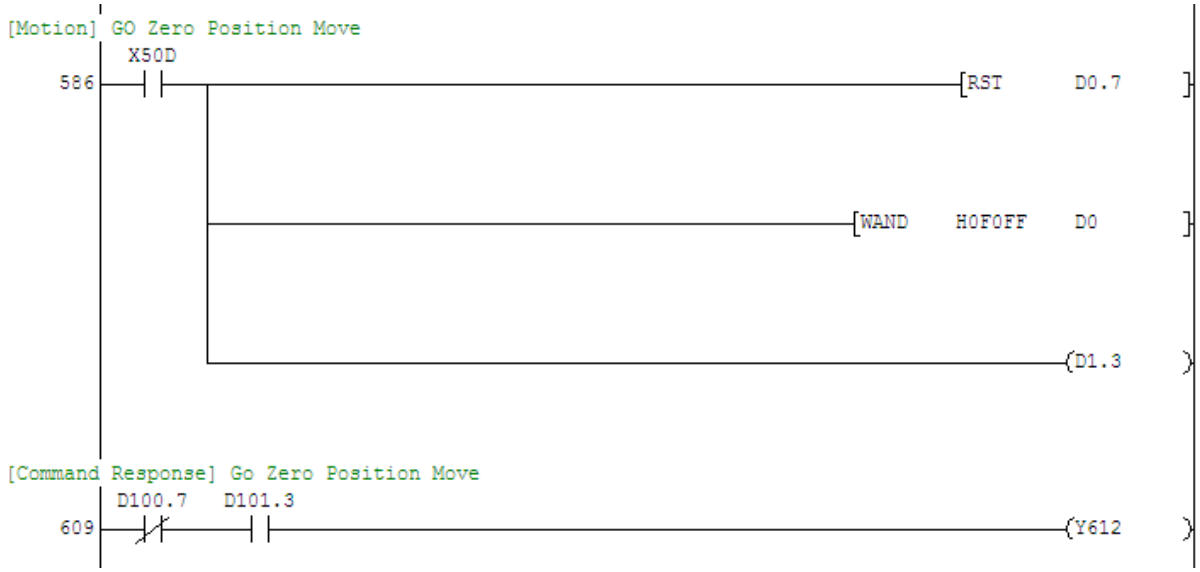
RESPONSE_TYPE_RESP = 0001b

GO_ZERO_POS_RESP bit = 1,

MOTIONING bit = 1

RESPONSE_DATA = Command Position (0)

✓ **LADDER**



NOTE : The ladder of Example 14 is the added command to Example 13 and the contents of the previousexample were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING Bit(D000.7) with Close input of X50D and change the IO-Map to motion Mode type.

② Enter the command code '0' into CMD_CODE Area (D000.8~D000.B).

③ Run the command when -GO_ZERO_POS Bit (D001.3) is ON.

④ The response for Zero Position Move Command can be verified by NC input of MOTION/SETTING_RESP. Bit(D100.7) and AND circuit of GO_ZERO_POS_Resp. Bit(D101.7).

5.2.4 Position Move Command

Incremental Move operates at the command code (CMD_CODE) '1' which is in the MOTION Mode (MOTIONING/SETTING = 0) status and moves to input data (D002) with position value for Incremental Move or Absolute Move.

■ Incremental Move

Incremental Move is the command to run the incremental move with the entered position value. Example 15 is the example for Incremental Move of Axis-0.

Example 15. Incremental Move Command

✓ **Control Bit map information**

- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  INC/ABS – D001.8
  CMD_START – D000.4
  Command Data Area – D002~D003 (D002 [1 DWORD])
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  MOTIONING – D101.1
  CMD_ RESP – D100.4

✓ **IO Information**

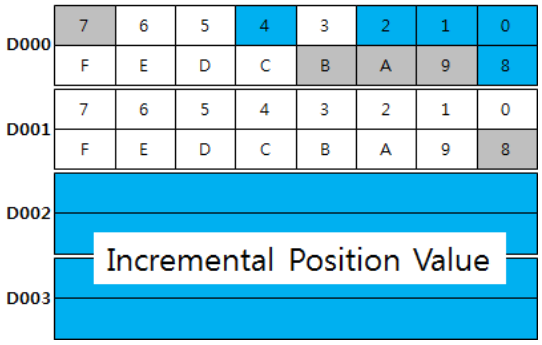
- **Input information**
  INC Move – X50E
  Incremental Position (Input range : -2,147,483,648 ~ −2,147,483,647 [DWORD])
- **Output information**
  MOTIONING – Y604
  POS MOV Resp – Y613 *)

*) For the verification of the response for Position Move Command, refer to Example 17: Response verification method for Position Move Command

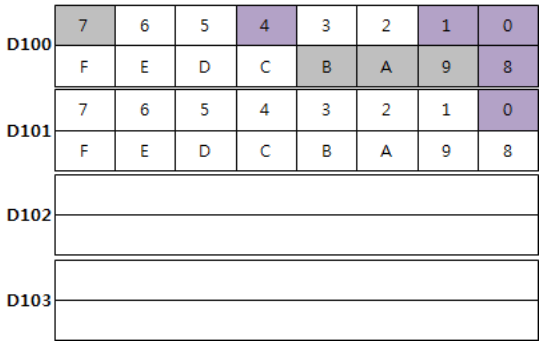
✓ IO-Map Command and Response Type

- Run INC Move Command

Input-Map



Output-Map



MOTION/SETTING bit = 0

CMD_CODE = 0001b

INC/ABS bit = 0

Command Data = Incremental position value

CMD_START bit = 1

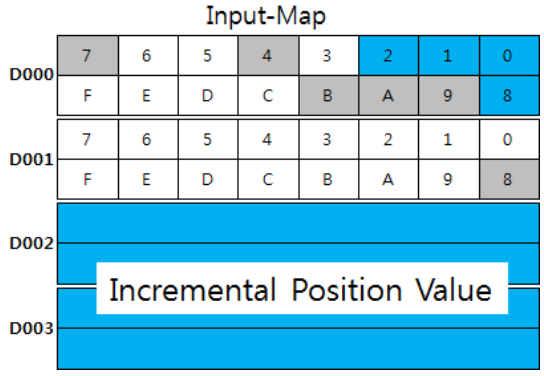
MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0001b

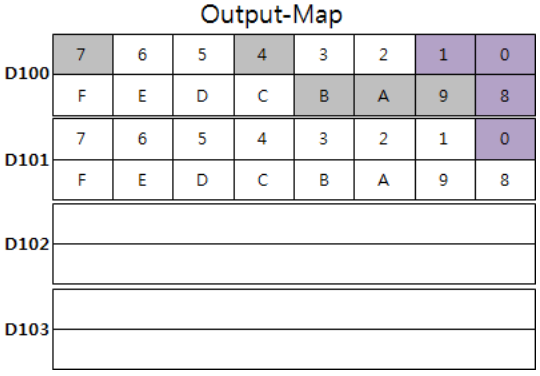
CMD_RESP bit = 1, MOTIONING bit = 1

- Reset CMD_START Bit after INC Move command

Input-Map



Output-Map



MOTION/SETTING bit = 0

CMD_CODE = 0001b

INC/ABS bit = 0

Command Data = Incremental position value

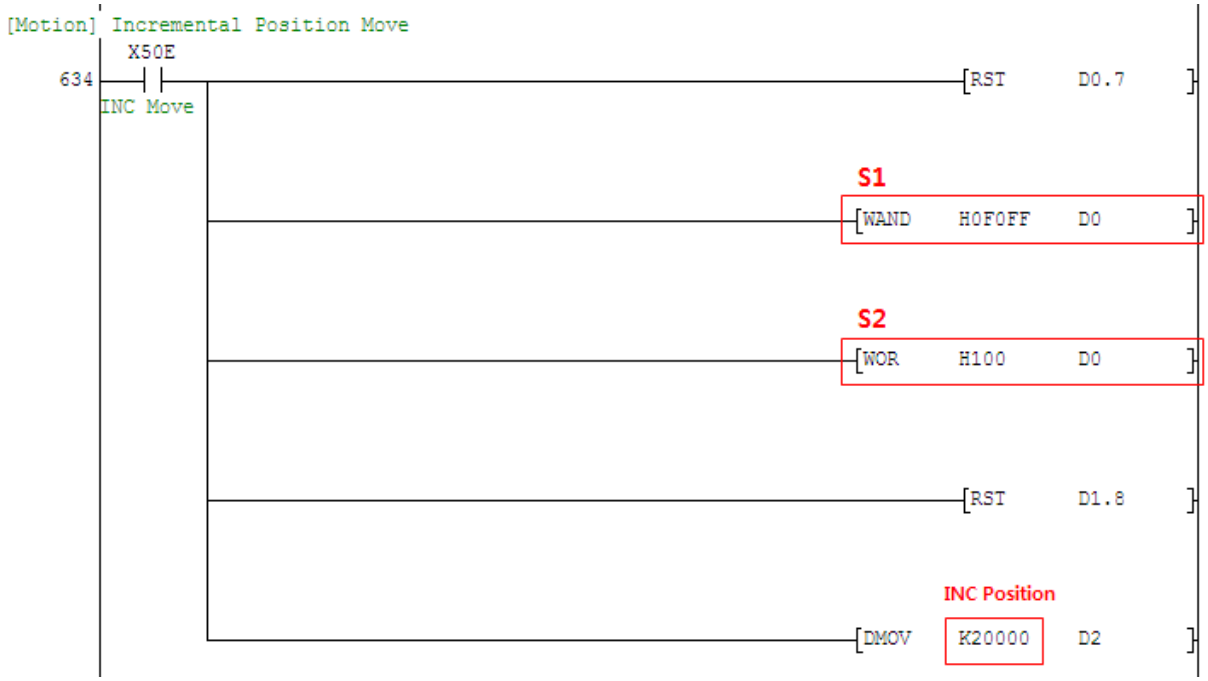
CMD_START bit = 0

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0001b

CMD_RESP bit = 0, MOTIONING bit = 1

✓ **LADDER**



NOTE : The ladder of Example 15 is the added command to Example 14 and the contents of the previous example were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING Bit(D000.7) with Close input of X50E and change the IO-Map to motion Mode status.

② Enter into 'S' area by MOV command and enter the command code '1' into CMD_CODE Area (D000.8~D000.B). (Initialize CMD_CODE as '0' in S1 and set as '1' in S2.)

③ Reset INC/ABS Bit (D001.8).

④ Enter the incremental position value into Data Area(D002) of Axis-0.
(Example 14 is the ladder that entered the incremental value 20000 pulse in D002 area by DMOV command.)

⑤ Refer to Example 9 and run the command when CMD_START Bit(D000.4) is ON.

■ Absolute Move

Absolute Move is the command to run the absolute move with input Data(D002). Example 16 is the example for absolute Move of Axis-0.

Example 16. Absolute Move Command

✓ **Control Bit Map Information**

- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  INC/ABS – D001.8
  CMD_START – D000.4
  Command Data Area – D002~D003 (D002 [1 DWORD])
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – X1008~D100.B
  MOTIONING – D101.1
  CMD_ RESP – D100.4

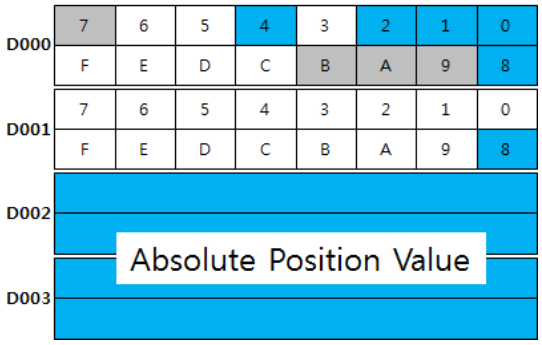
✓ **IO Information**

- **Input information**
  ABS Move - X50F
  Absolute Position (Input range : -2,147,483,648 ~ −2,147,483,647 [DWORD])
- **Output information**
  MOTIONING - Y604
  POS MOV Resp - Y613

✓ IO-Map Command and Response Type

- Run ABS Move Command

Input-Map



MOTION/SETTING bit = 0

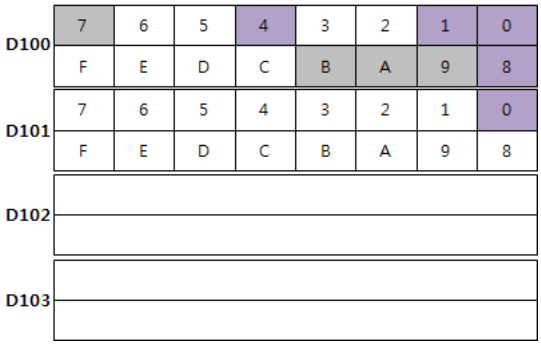
CMD_CODE = 0001b

INC/ABS bit = 1

Command Data = Absolute position value

CMD_START bit = 1

Output-Map



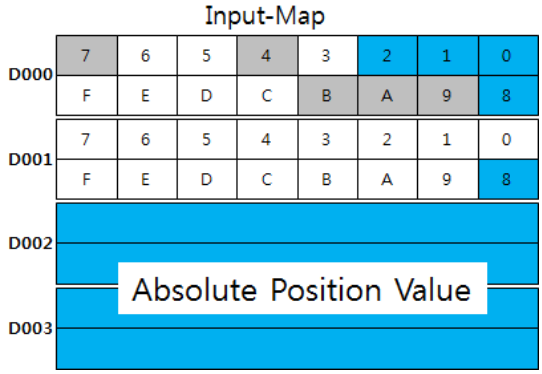
MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0001b

CMD_RESP bit = 1, MOTIONING bit = 1

- Reset CMD_START Bit after ABS Move Command

Input-Map



MOTION/SETTING bit = 0

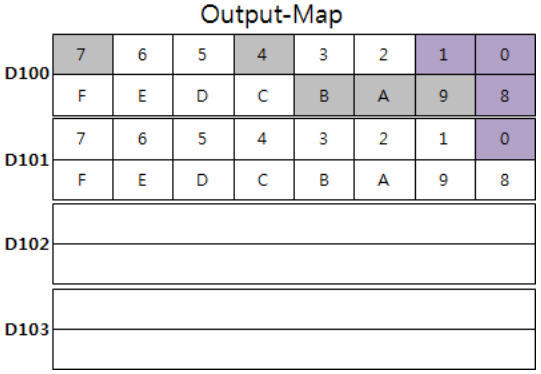
CMD_CODE = 0001b

INC/ABS bit = 1

Command Data = Absoute position value

CMD_START bit = 0

Output-Map

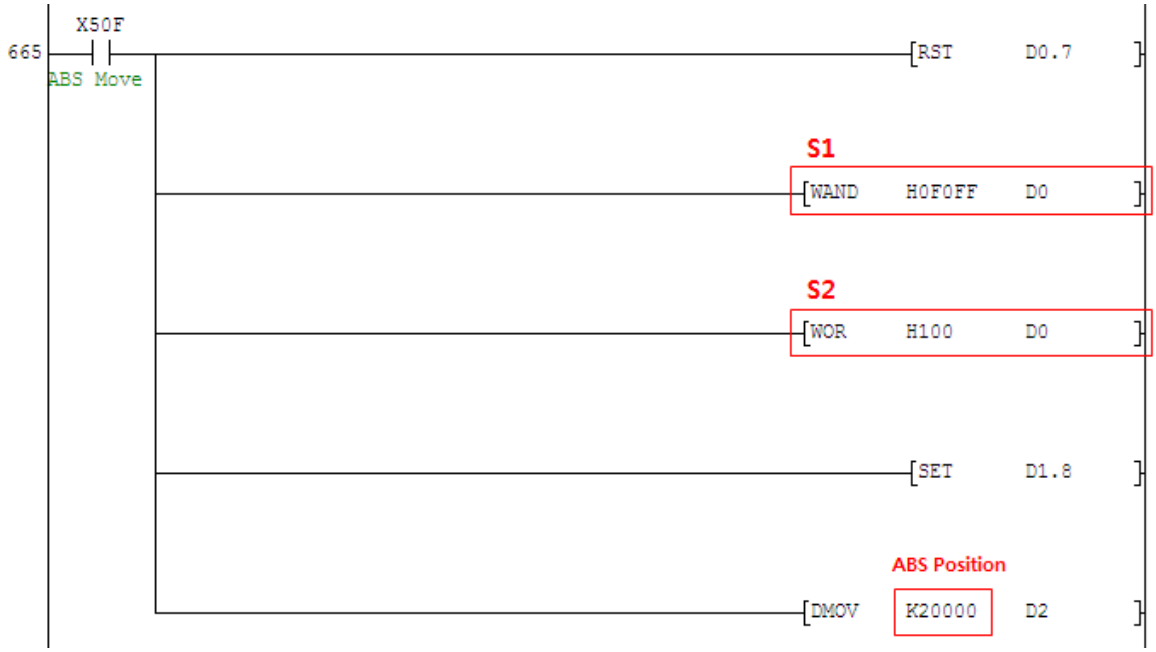


MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0001b

CMD_RESP bit = 0, MOTIONING bit = 1

✓ **LADDER**



NOTE : The ladder of Example 16 is the added command to Example 15 and the contents of the previous example were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING Bit(D000.7) with Close input of X50F and change the IO-Map to motion Mode status.

② Enter the command code '1' for 'S' Area of MOV Command in CMD_CODE Area (D000.8~D000.B) (Initialize CMD_CODE as '0' in S1 and set as '1' in S2.)

③ Clear INC/ABS Bit (D001.8).

④ Enter the absolute position value into Data Area (D002) of Axis-0.
(For Example 16, the ladder is the one that entered the absolute position value of 20000 pulse by DMOV Command in D002 area.)

⑤ Refer to Example 9 and run the command when CMD_START Bit (D000.4) is ON.

※ Verify the response for Position Move Command

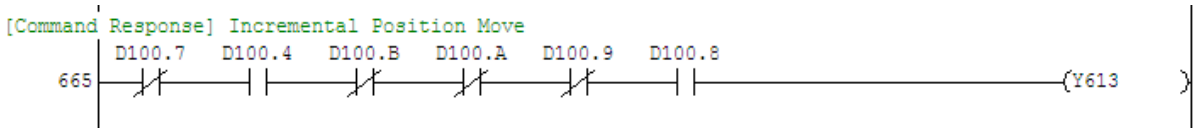
The response bit for Position Move Command shall not be verified by the IO-Map like JOG Move or Step Move, Zero Position Move, etc. Thus, this command can be verified by the combination of IO-Map like Example 17.

Example 17. Response verification method for Position Move Command

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

✓ **LADDER**



NOTE : The ladder of Example 17 is the added command to Example 16 and the contents of the previous example were omitted.

① The response of Position Move Command can be verified by the combination of IO-Map.

▶ The response of Position Move Command is the resulting value formed by AND circuit for CMD_START_RESP(D100.4), the status value that MOTION/SETTING_RESP Bit compared NC input of (D100.7) and CMD_CODE_RESP Area (D100.8~D100.B) with '1'.

5.2.5 PT RUN Command

PT RUN operates at the command code (CMD_CODE) '4' of the MOTION mode (MOTIONING/SETTING = 0) status and run the operation by entering the No. Of PT item into the input data (D002).

■ General PT RUN

General PT RUN starts PT RUN from the input value (D002). Example 18 is the example for PT RUN command of Axis-0.

Example 18. PT RUN Command

✓ **Control Bit Map Information**

- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  SINGLE_PT – D001.C
  CMD_START –D000.4
  Command Data Area – D002~D003 (D002 [1 DWORD])
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  MOTIONING – D101.1
  CMD_ RESP – D100.4
  PT_RUNUNG – D101.8

✓ **IO Information**

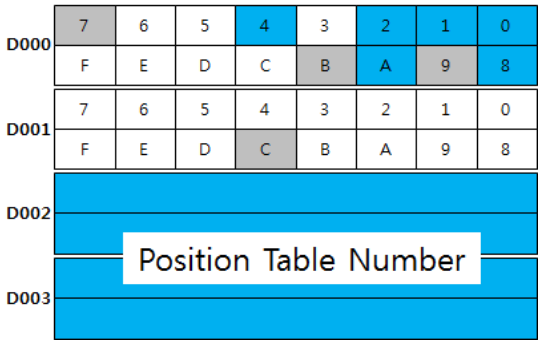
- **Input information**
  PT Run – Y510
  PT No. (The No. that PT item is saved [DWORD Type])
- **Output information**
  MOTIONING – Y604
  PT CMD Resp – Y614 *)
  PT Running – Y606

*) For the verification of the response for PT RUN Command, refer to Example 20: Response Verification Method for Position Table Command

✓ IO-Map Command and Response Type

- Run PT RUN Command

Input-Map



MOTION/SETTING bit = 0

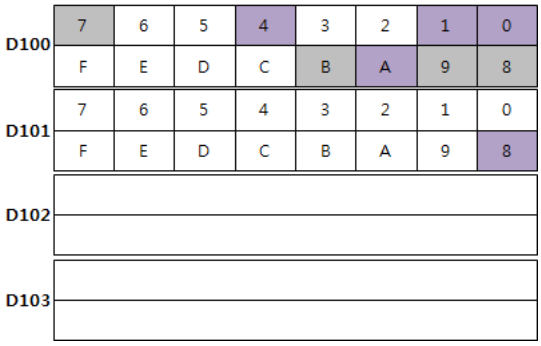
CMD_CODE = 0100b

SINGLE_PT bit = 0

Command Data = PT No.

CMD_START bit = 1

Output-Map



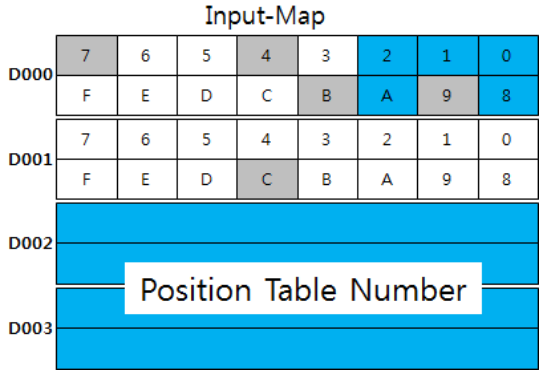
MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0100b

CMD_RESP bit = 1, PT_RUNNING bit = 1

- Reset CMD_START Bit after PT RUN command

Input-Map



MOTION/SETTING bit = 0

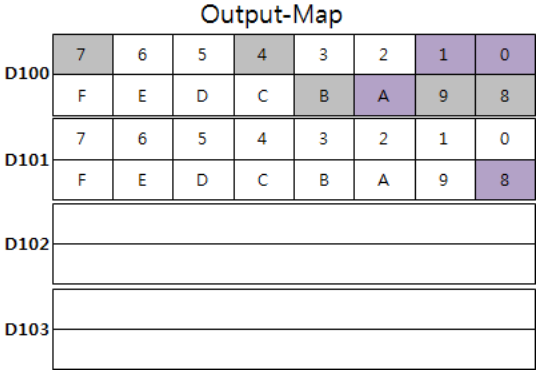
CMD_CODE = 0100b

SINGLE_PT bit = 0

Command Data = PT No.

CMD_START bit = 0

Output-Map

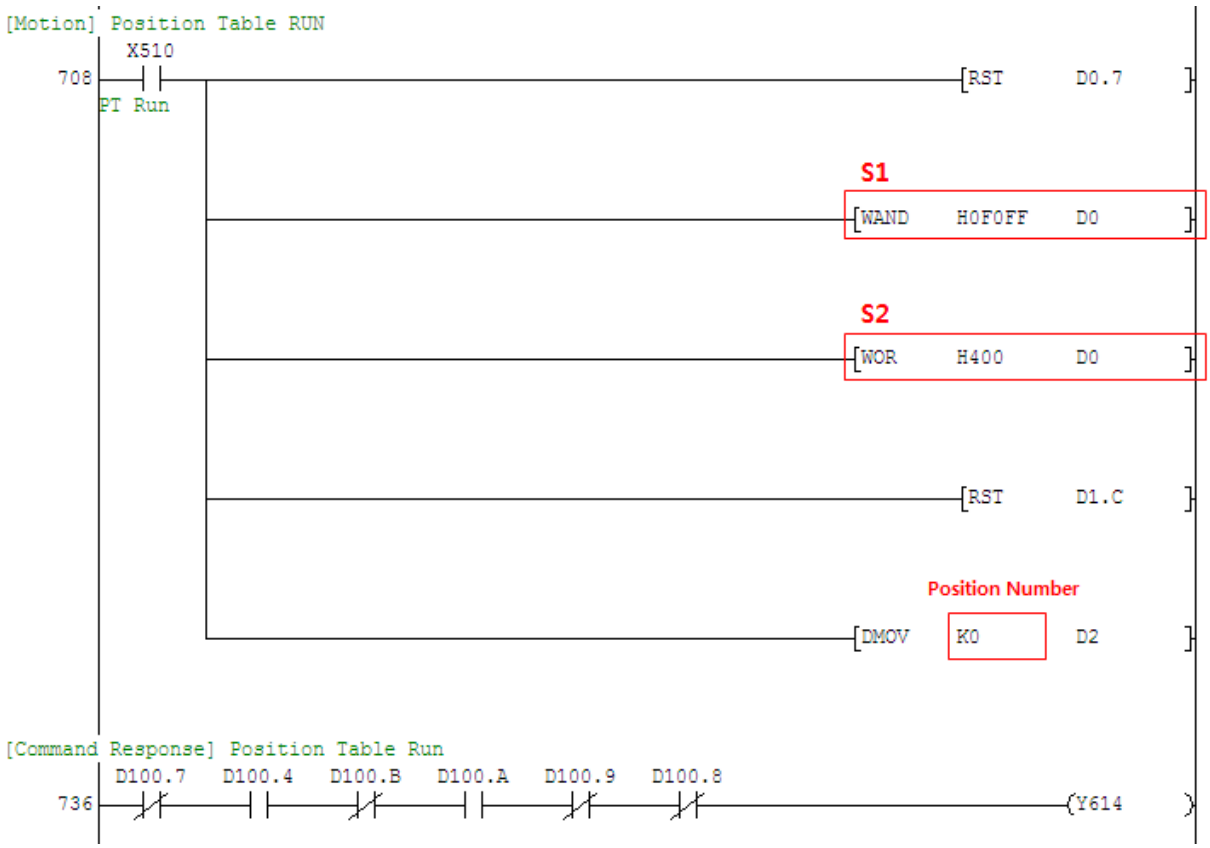


MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0100b

CMD_RESP bit = 0, PT_RUNNING bit = 1

✓ **LADDER**



NOTE 1: The ladder of Example 18 is the added command to Example 17 and the contents of the previous example were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING Bit(Y0007) with Close input of X511 and change the IO-Map to motion Mode status.

② Enter the command code '4' into CMD_CODE Area (D000.8~D000.B) by MOV Command (D000.8~D000.B) (Initialize CMD_CODE as '0' in S1 and set as '4' in S2).

③ Clear SINGLE_PT Bit (D001.C).

④ Enter the PT No. to start into Data Area(D002) of Axis-0.
(For Example 18. It is the ladder that entered the PT No. '0' for 'S' of DMOV Command in D0000.)

⑤ Refer to Example 9 and run the command when CMD_START Bit(D000.4) is ON.

■ Single PT RUN

Single PT RUN operates for one PT item from the entered value (D0000). Example 19 is the example for Single PT RUN of Axis-0.

Example 19. Single PT RUN Command

✓ **Control Bit Map Information**

- **Input-Map**

  MOTION/SETTING – D000.7
  CMD_CODE – D000. 8~D000.B
  SINGLE_PT – D001.C
  CMD_START – D000.4
  Command Data Area – D002~D003 (D002 [1 DWORD])

- **Output-Map**

  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  MOTIONING – D101.1
  CMD_ RESP – D100.4
  PT_RUNUNG – D101.8

✓ **IO Information**

- **Input information**

  Single PT Run
  PT No. (The No. that PT item is saved [DWORD])

- **Output information**

  MOTIONING – Y604
  PT CMD Resp – Y614 *)
  PT Running – Y606

*) For the verification of the response for Single PT RUN Command, refer to Example 20: Response Verification Method for Position Table Command

✓ IO-Map Command and Response Type

- Run Single PT RUN Command

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002	Position Table Number							
D003								

MOTION/SETTING bit = 0

CMD_CODE = 0100b

SINGLE_PT bit = 1

Command Data = PT No.

CMD_START bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0100b

CMD_RESP bit = 1, PT_RUNNING bit = 1

- Reset CMD_START Bit after single PT RUN Command

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002	Position Table Number							
D003								

MOTION/SETTING bit = 0

CMD_CODE = 0100b

SINGLE_PT bit = 1

Command Data = PT No.

CMD_START bit = 0

Output-Map

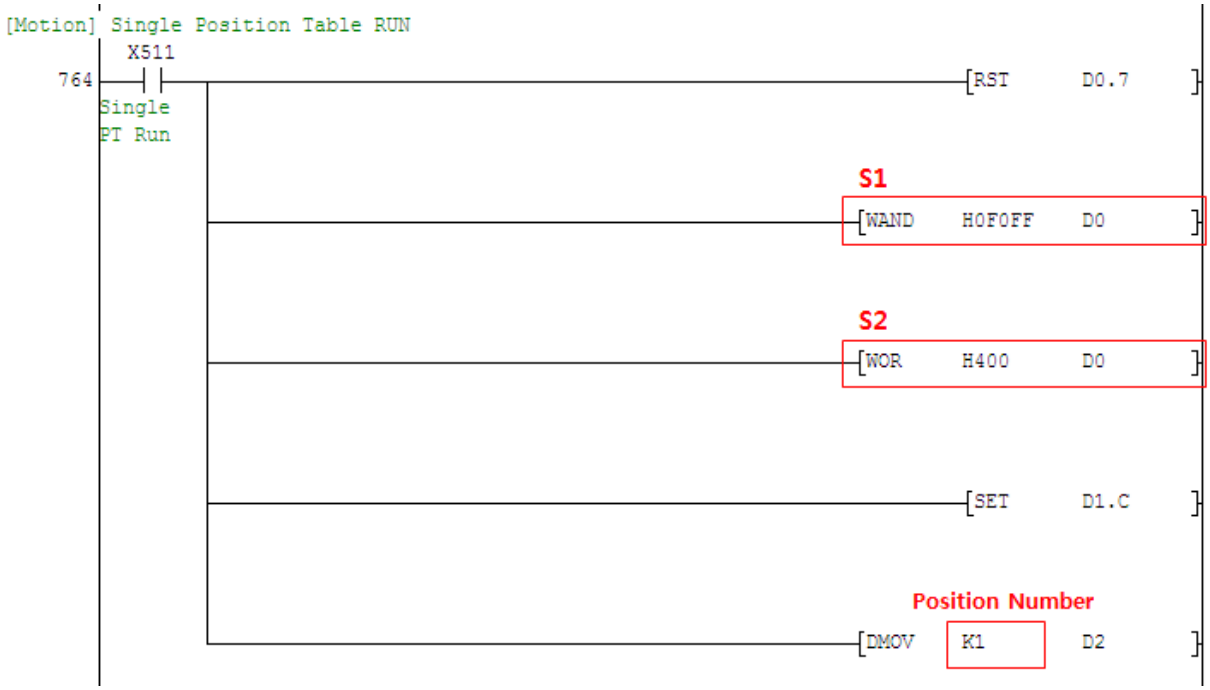
	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0100b

CMD_RESP bit = 0, PT_RUNNING bit = 1

✓ **LADDER**



NOTE 1: The ladder of Example 19 is the added command to Example 15 and the contents of the previous example were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING Bit(D000.7) with Close input of X50F and change the IO-Map to motion Mode status.

② Enter the command code '4' into CMD_CODE area (D000.8~D000.B) by MOV command. (Initialize CMD_CODE as '0' in S1 and set as '4' in S2).

③ Set SINGLE_PT Bit (D001.C).

④ Enter the PT No. to operate into Data Area (D002) of Axis-0.
(Example 19 is the ladder that entered the PT No. '1' in D002 area by DMOV command.)

⑤ Refer to Example 9 to run the command when CMD_START Bit(D000.4) is ON.

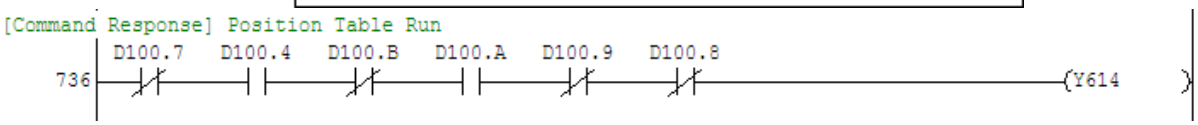
■ **Response verification for PT RUN Command**

Command Response Bit of PT RUN cannot be verified by IO-Map such as JOG Move or Step Move, or Zero Position Move. Thus, it can be verified by the combination of IO-Map like Example 20.

Example 20. Response Verification Method for Position Table Command

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
	7	6	5	4	3	2	1	0
D101	F	E	D	C	B	A	9	8
D102								
D103								



NOTE : The ladder of Example 20 is the added command to Example 19 and the contents of the previous example were omitted.

① The response of PT RUN Command can be verified by the IO-Map combination.

▶ The response of PT RUN Command is the resulting value formed by AND circuit for the N.C input of MOTION/SETTING_RESP bit (D100.7), the information of CMD_CODE_RESP Area (D100.8~D100.B='4'), and the response information of CMD_START_RESP(X1004).

5.2.6 Origin Search Command

Origin Search Command operates at the command code (CMD_CODE) '7' of the MOTION mode (MOTIONING/SETTING = 0) status regardless of the value entered in the data area (D002). Example 21 is the example for Origin Search Command of Axis-0.

Example 21. Origin Search Command

✓ **Control Bit Map Information**

- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  CMD_START – D000.4
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  MOTIONING – D101.1
  CMD_ RESP – D100.4

✓ **IO Information**

- **Input information**
  ORIGIN Search – X512
- **Output information**
  MOTIONING – Y604
  Origin Mov Resp – Y60B

✓ **IO-Map Command and Response Type**

- **Run Origin Search**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101	7	6	5	4	3	2	1	0
	F	E	D	C	B	A	9	8
D102								
D103								

MOTION/SETTING bit = 0

CMD_CODE = 0111b

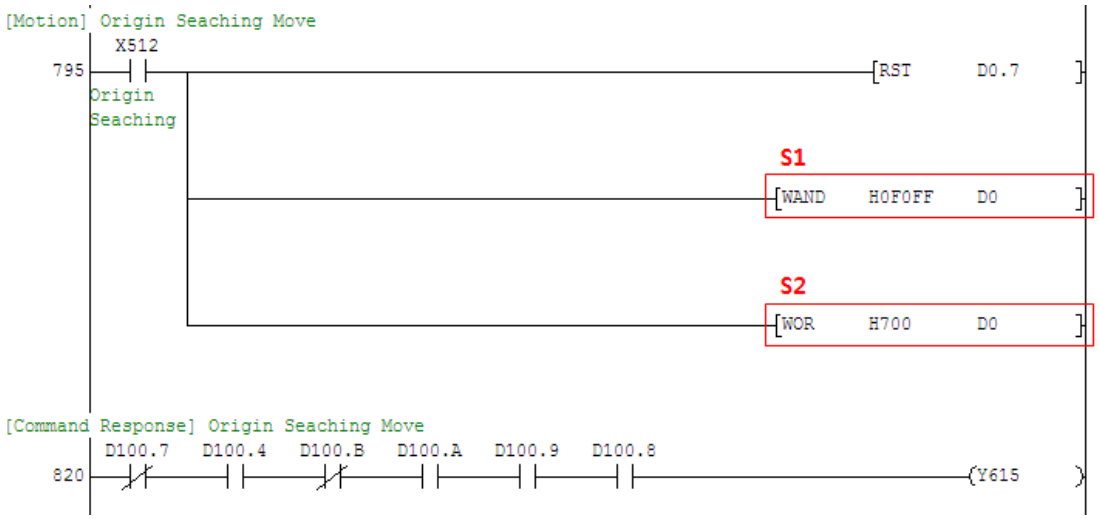
CMD_START bit = 1

MOTION/SETTING_RESP bit = 0

CMD_CODE_RESP = 0111b

CMD_RESP bit = 1, PT_RUNNING bit = 1

✓ **LADDER**



NOTE 1: The ladder of Example 21 is the added command to Example 20 and the contents of the previous example were omitted.

✓ **Command sequence**

① Clear MOTION/SETTING Bit(D000.7) with Close input of X50E and change the IO-Map to motion Mode status.

② Enter the command code '7' into CMD_CODE Area (D000.8~D000.B) (Initialize CMD_CODE as '0' in S1 and set as '7' in S2).

③ Refer to Example 9 and run the command when CMD_START Bit(D000.4) is ON.

④ The response of this Command can be verified by combining the IO-Map of Origin Search Command.

▶ The response of PT RUN Command is the resulting value formed by AND circuit for the N.C input of MOTION/SETTING_RESP bit (D100.07), the information of CMD_CODE_RESP Area (D100.8~D100.B='7'), and the response information of CMD_START_RESP(X1004).

5.2.7 Parameter Setting

Parameter Setting enables reading, setting, and saving the parameter and PT information for the motor drive of the corresponding axis.

- Read Parameter Command

READ Parameter operates at the command code (CMD_CODE) '8' which is in Setting Mode (MOTIONING/SETTING=1) and is the command that requests the parameter corresponding to the index area D001 or the value of PT information, etc. At this time, this command operates regardless of the value entered in the data area (D002). Example 22 is the example for READ Parameter of Axis-0.

Example 22. READ Parameter Command

✓ **Control Bit Map Information**

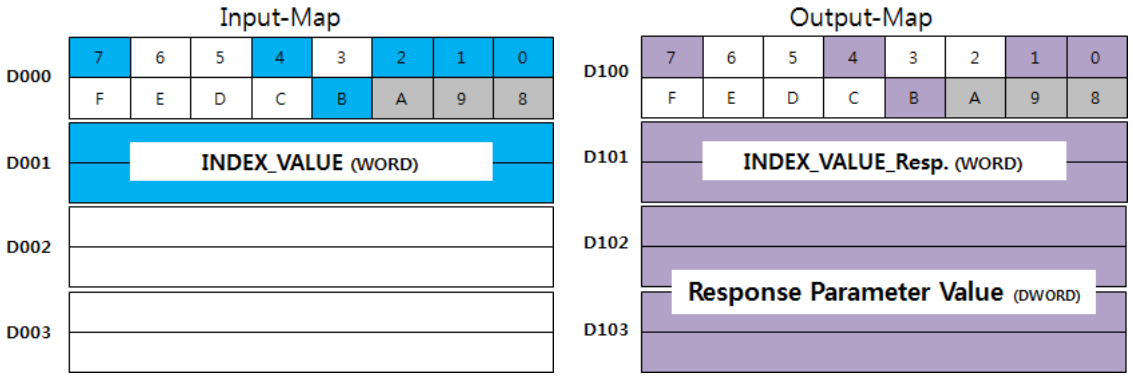
- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  INDEX_VALUE– D001 (1WORD)
  CMD_START – D000.4
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  INDEX_VALUE_RESP – D101 (1WORD)
  RESPONSE
  CMD_ RESP – D100.4

✓ **IO Information**

- **Input information**
  Read Parameter – X513
- **Output information**
  Read Parameter Response Value

✓ **IO-Map Command and Response Type**

- **Run Origin Search**



MOTION/SETTING bit = 1

CMD_CODE = 1000b

INDEX_VALUE = Index Value (Parameter No)

CMD_START bit = 1

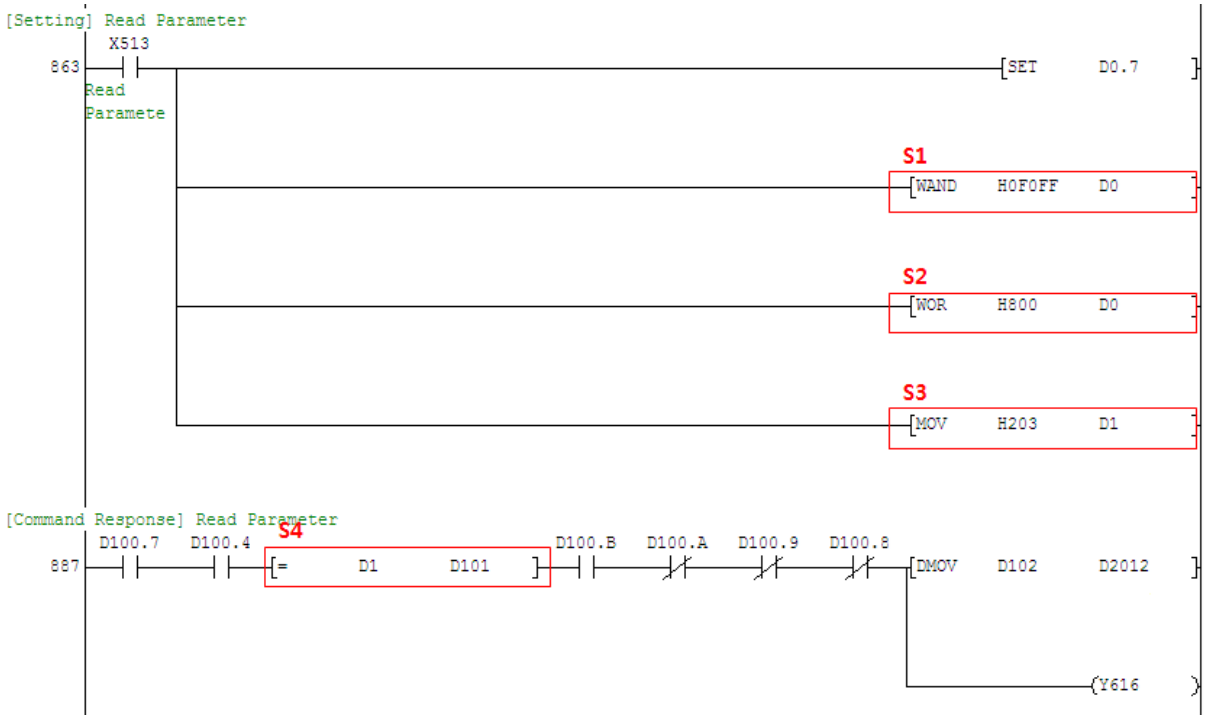
MOTION/SETTING_RESP bit = 1

CMD_CODE_RESP = 1000b

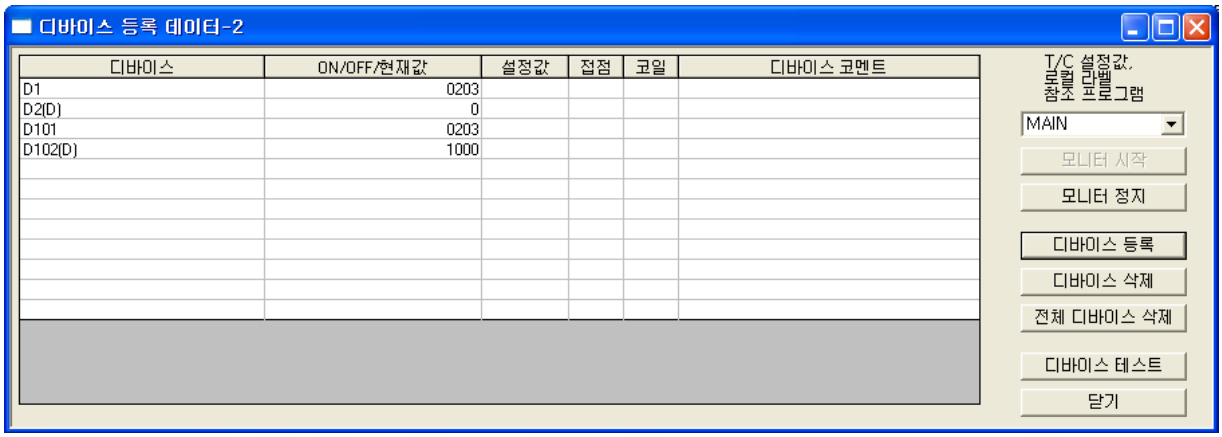
INDEX_VALUE_RESP = Index Value (Parameter No)

CMD_RESP bit = 1

✓ **LADDER**



NOTE 1: The ladder of Example 22 is the added command to Example 21 and the contents of the previous example were omitted.



NOTE 2: Run Example 22 to obtain the parameter value requested by D100.

NOTE 3: The parameter no. which was entered into the Index Area from Example 22 shall be loop-backed to INDEX_RESP. Area(X101) with 16Bit Data.

✓ **Command sequence**

① Set MOTION/SETTING Bit(D000.7) with Close input of X513 and change the IO-Map to Setting Mode status.

② Enter the command code '8' into CMD_CODE Area (D000.8~D000.B) (Initialize CMD_CODE as '0' in S1 and set as '8' in S2).

③ Enter the parameter no. into INDEX Area (D001).

(In S3, enter parameter PN#0203『Step Distance 3』by MOV Command)

④ Refer to Example 10 and run the command when CMD_START Bit(D000.4) is ON.

⑤ The response of READ Parameter Command can be varied by the IO-Map combination.

▶ The response of READ Parameter Command is the resulting value formed by AND circuit for the N.O. input of MOTION/SETTING_RESP Bit value(D100.7), the status value compared to the CMD_CODE_RESP area (D100.8~D100.B) with '8', the resulting value compared to the value of INDEX_Resp. Area (D101) as a comparison of S4 and parameter no. (D001), and the resulting value formed by AND circuit for CMD_START_RESP(D100.4).

(This example saved the value of requested parameter in D2012.)

■ Parameter Change Command

Parameter Change operates at the command code (CMD_CODE) '9' of the Setting Mode(MOTIONING/SETTING=1) status and is the command that changes the parameter no. prepared in the Index Area (K4Y0010) with the value set in Input Data Area (D0000). Example 23 is the example for Parameter Change Command of Axis-0.

Example 23. Parameter Change Command

✓ **Control Bit Map Information**

- **Input-Map**

  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  INDEX_VALUE – D001 [1 WORD]
  COMMAND_WORD_DATA – D002 [2 DWORD]
  CMD_START – D000.4

- **Output-Map**

  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  INDEX_VALUE_RESP – D101 [1WORD]
  CMD_ RESP – X1004
  RESPONSE_DATA – D102~D103 (D102 [1 DWORD])

✓ **IO Information**

- **Input information**

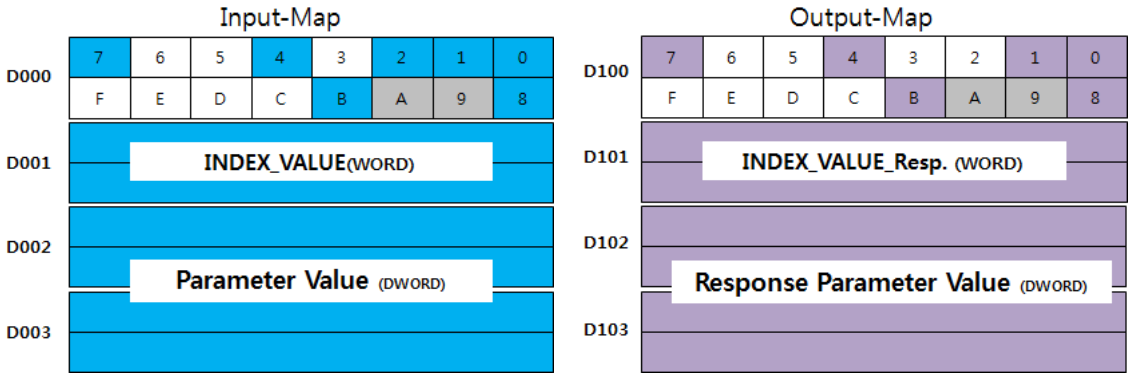
  Write Parameter – X514
  Write Parameter Value

- **Output information**

  Read Parameter Value

✓ IO-Map Command and Response Type

- Run Parameter value change



MOTION/SETTING bit = 1

CMD_CODE = 1001b

INDEX_VALUE = Index Value (Parameter No)

COMMAND_WORD_DATA = Write Parameter Value

CMD_START bit = 1

MOTION/SETTING_RESP bit = 1

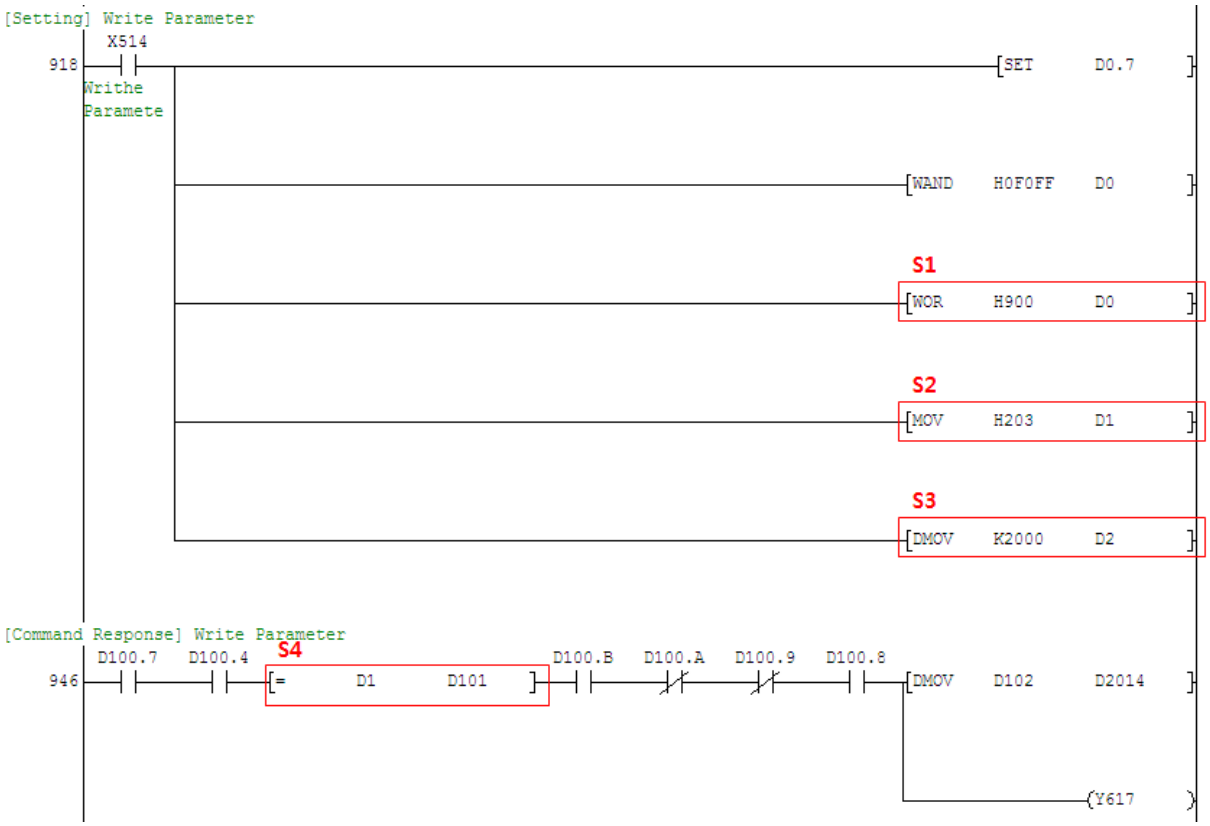
CMD_CODE_RESP = 1001b

INDEX_VALUE_RESP = Index Value (Parameter No)

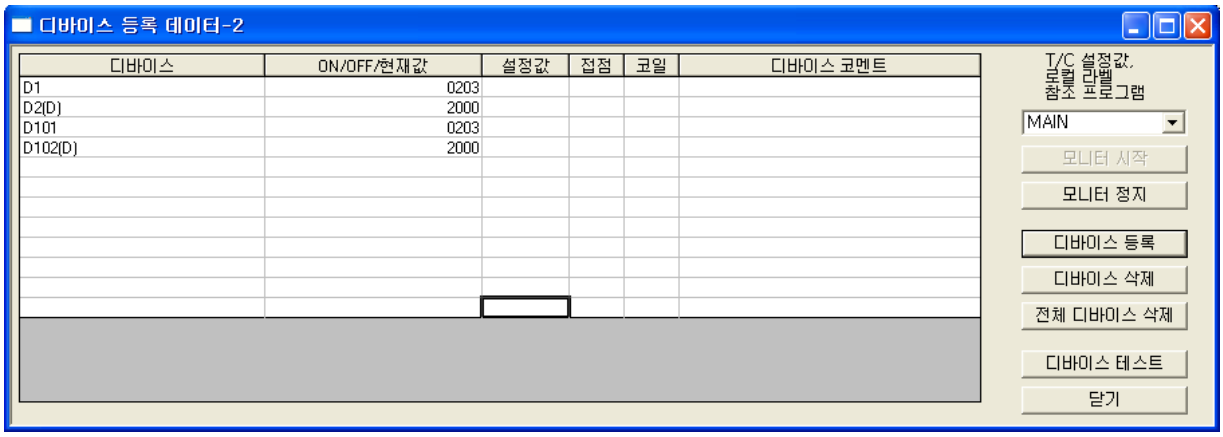
RESPONSE_DATA = Response Parameter Value

CMD_RESP bit = 1

✓ LADDER



NOTE : The ladder of Example 23 is the added command to Example 22 and the previous example was omitted.



NOTE 2: Run Example 23 to obtain the changed parameter value with D100.

NOTE 3: The parameter no. entered in the Index Area from Example 23 shall be loop-backed to INDEX_RESP. Area(X101) with 16Bit Data.

✓ Command sequence

① Set MOTION/SETTINGBit(D000.7) with Close input of X514 and change the IO-Map to Setting Mode status.

② Enter the command code '9' into CMD_CODE Area (D000.8~D000.B) by MOV Command (Initialize CMD_CODE as '0' in S1 and set as '9' in S2).

③ Enter the parameter no. into the INDEX Area (D001).

(Enter parameter PN#0203『Step Distance 3』in S3 by MOV Command)

④ Enter the value of parameter to change into the data area (D002) of Axis-0.

(For this example, it is the ladder that entered the value of 2000[puse] by DMOV command.)

⑤ Refer to Example 10 and run the command when CMD_START Bit (D000.4) is ON.

⑥ The response of Parameter Change Command can be verified by the IO-Map combination.

▶ The response of READ Parameter Command is the resulting value formed by AND circuit for the N.O. input of MOTION/SETTING_RESP Bit value(D100.7), the status value compared to the CMD_CODE_RESP area (D100.8~D100.B) with '8', the resulting value compared to the value of INDEX_Resp. Area (D101) as a comparison of S4 and parameter no. (D001), and the resulting value formed by AND circuit for CMD_START_RESP(D100.4).

■ Parameter Save

Parameter Save operates at the command code (CMD_CODE) '14' of the setting mode (MOTIONING/SETTING=1) status and saves the parameter value in the ROM area. Example 24 is the example for parameter Save command of Axis-0.

Example 24. Parameter Save Command

✓ **Control Bit Map Information**

- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  INDEX_VALUE – D001 [1 WORD]
  CMD_START – D000.4
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  INDEX_VALUE_RESP – D101 (1WORD)
  CMD_ RESP – D100.4

✓ **IO Information**

- **Input information**
  Save Parameter – X515
- **Output information**
  Save Parameter Resp – Y616

✓ **IO-Map Command and Response Type**

- **Parameter Save Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001								
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101								
D102								
D103								

MOTION/SETTING bit = 1

CMD_CODE = 1110b

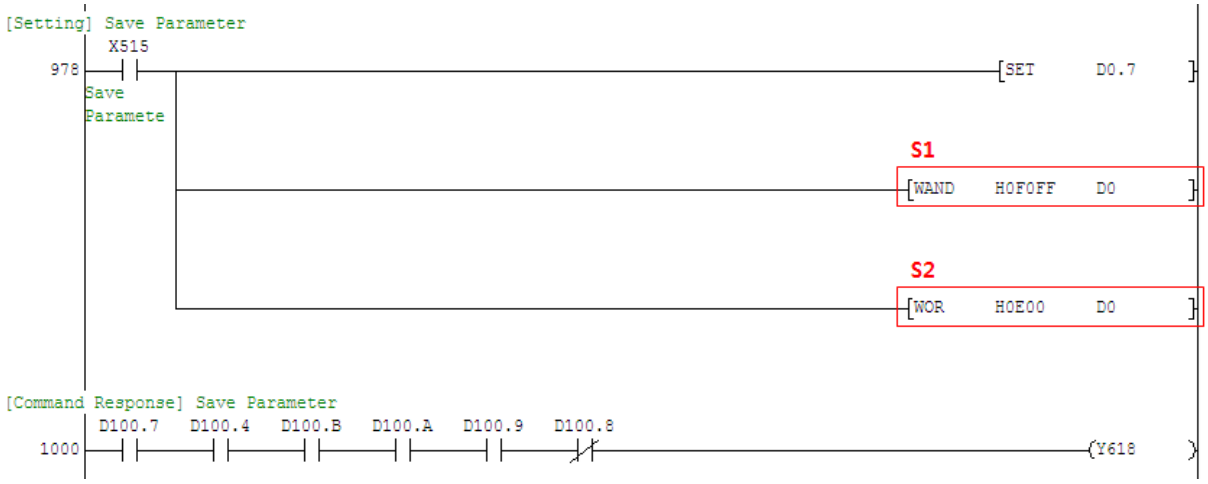
CMD_START bit = 1

MOTION/SETTING_RESP bit = 1

CMD_CODE_RESP = 1110b

CMD_RESP bit = 1

✓ **LADDER**



NOTE 1: The ladder of Example 24 is the added command to Example 23 and the contents of the previous example were omitted.

✓ **Command sequence**

① Set MOTION/SETTING Bit(D000.7) with Close input of X515 and change the IO-Map to Setting Mode.

② Enter the command code '14' into CMD_CODE Area (D000.8~D000.B) by MOV Command (Initialize CMD_CODE as '0' in S1 and set as '14' in S2).

③ Refer to Example 10 and run the command when CMD_START Bit(D000.4) is ON.

④ The response of this Command can be verified by the IO-Map combination.

▶ The response of parameter save command is the N.O input of MOTION/SETTING_RESP Bit (D100.7), the status value of CMD_CODE_RESP area (D100.8~D100.B) with '14' and the result value formed by AND circuit for CMD_START_RESP (D100.4)

5.2.8 Set Position

Set Position command operates at the command code (CMD_CODE) '10' of the setting mode (MOTIONING/SETTING=1) status and changes the tracking position value (Command Position). Example 25 is the example for Position Value Change command of Axis-0.

Example 25. Position Value Change Command

✓ **Control Bit Map Information**

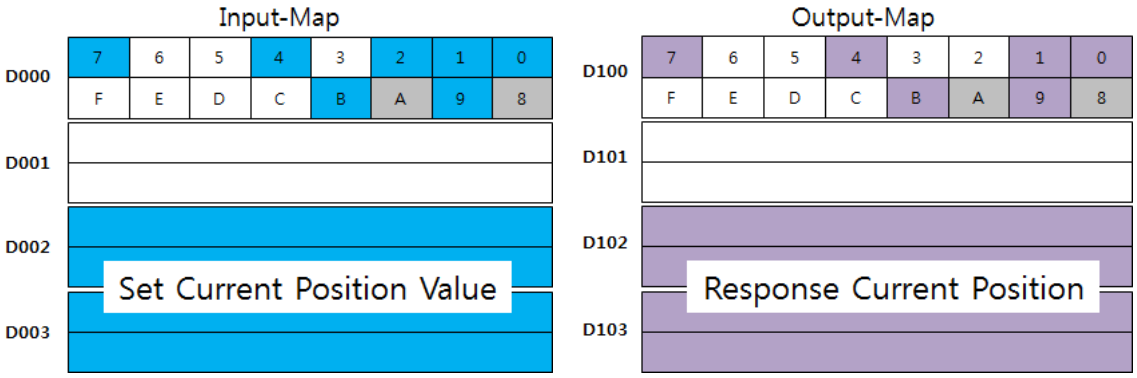
- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000B
  COMMAND_WORD_DATA – D002~D003 [DWORD]
  CMD_START – D000.4
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  CMD_ RESP – D100.4
  RESPONSE_DATA – D102~D103 (D102 [DWORD])

✓ **IO Information**

- **Input information**
  Set Position – X516
  Set Current Position Data
- **Output information**
  Response Current Position

✓ **IO-Map Command and Response Type**

- **Set current position Command**



MOTION/SETTING bit = 1

CMD_CODE = 1010b

COMMAND_WORD_DATA = Set Current Position

CMD_START bit = 1

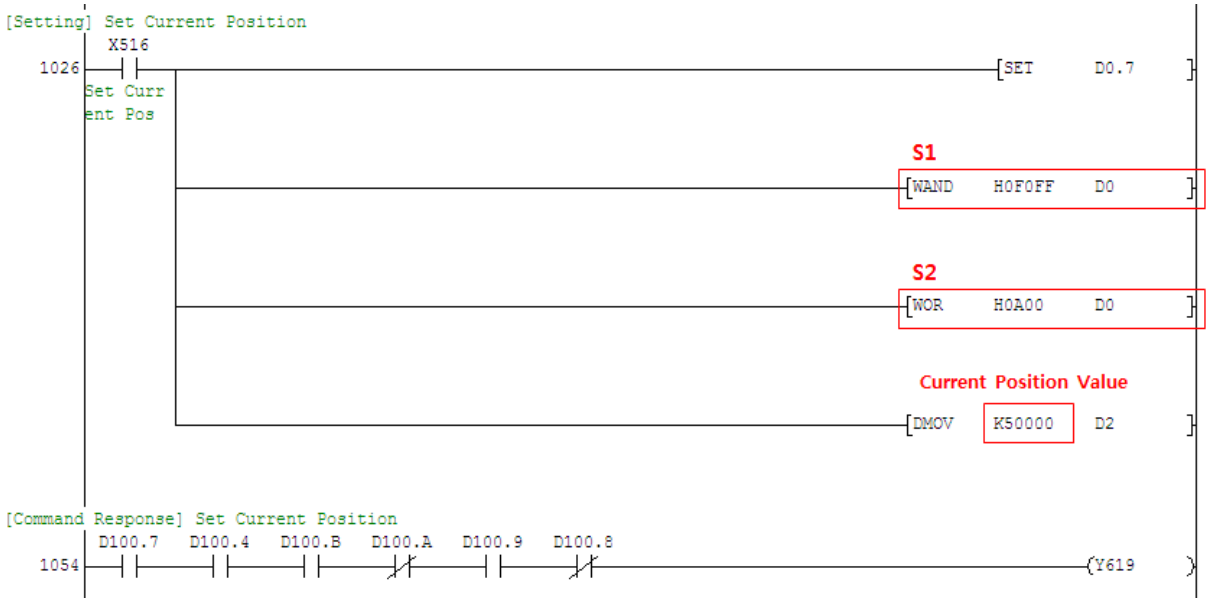
MOTION/SETTING_RESP bit = 1

CMD_CODE_RESP = 1010b

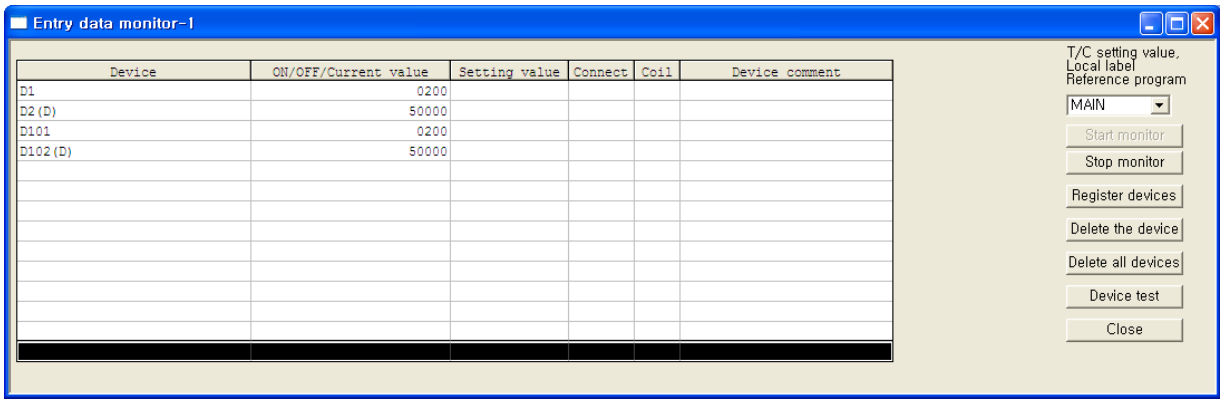
RESPONSE_DATA = Response Current Position

CMD_RESP bit = 1

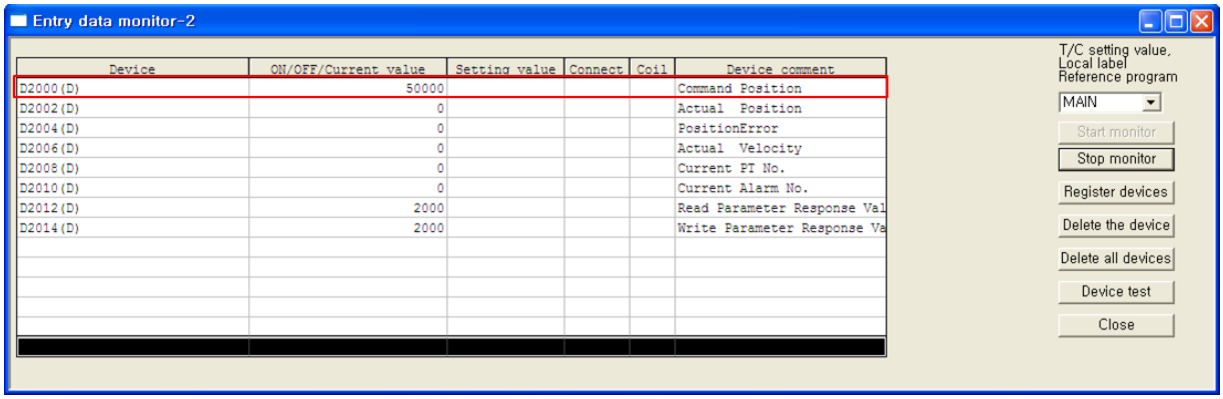
✓ **LADDER**



NOTE 1: The ladder of Example 25 is the added command to Example 24 and the contents of the previous example were omitted.



NOTE 2: Run Example 25 to obtain the changed tracking position value in the D102 Area.



NOTE 4: This is the screen that monitored the current position tracking value by running Example 7 after running Example 25.

✓ **Command sequence**

① Set MOTION/SETTING Bit (D000.7) with Close input of X516 and change the IO-Map to Setting Mode status.

② Enter the command code '10 into CMD_CODE Area (D000.8~D000.B).
(Initialize CMD_CODE as '0' in S1 and set as '10' in S2).

③ Refer to Example 10 and run the command when CMD_START Bit (D000.4) is ON.

④ The Set Position Command Response can be verified by the IO-Map combination.

▶ The response of parameter save command is the N.O input of MOTION/SETTING_RESP bit value (D100.7), the status value compared to CMD_CODE_RESP (D100.8~D100.B) with '10', and the resulting value formed by AND circuit for CMD_RESP(D100.4)

⑤ After running this Command, if the currently tracking value of the current tracking position is requested, it can be verified that this value was changed.

5.2.9 Alarm History Request & Initialization

MOTIONGATE can control the alarm history for 4 alarms from the alarm occurred recently.

- Alarm History Verification

Alarm History operates at the command code (CMD_CODE) '12' of the setting mode (MOTIONING/SETTING=1) status and verifies the alarm history occurred in the corresponding axis. Example 26 is the example for Alarm History verification of Axis-0.

Example 26. Alarm History Request

✓ **Control Bit Map Information**

- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  CMD_START – D000.4
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D100.8~D100.B
  CMD_ RESP – D100.4
  RESPONSE_DATA – D102~D103 (D102 [DWORD])

✓ **IO Information**

- **Input information**
  ALM History – X517
- **Output information**
  ALM His Resp – Y61A

✓ **IO-Map Command and Response Type**

- **Run Alarm History verification Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001								
D002								
D003								

MOTION/SETTING bit = 1

CMD_CODE = 1100b

CMD_START bit = 1

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101								
D102	1st Last Alarm Code							
	2nd Last Alarm Code							
D103	3rd Last Alarm Code							
	4th Last Alarm Code							

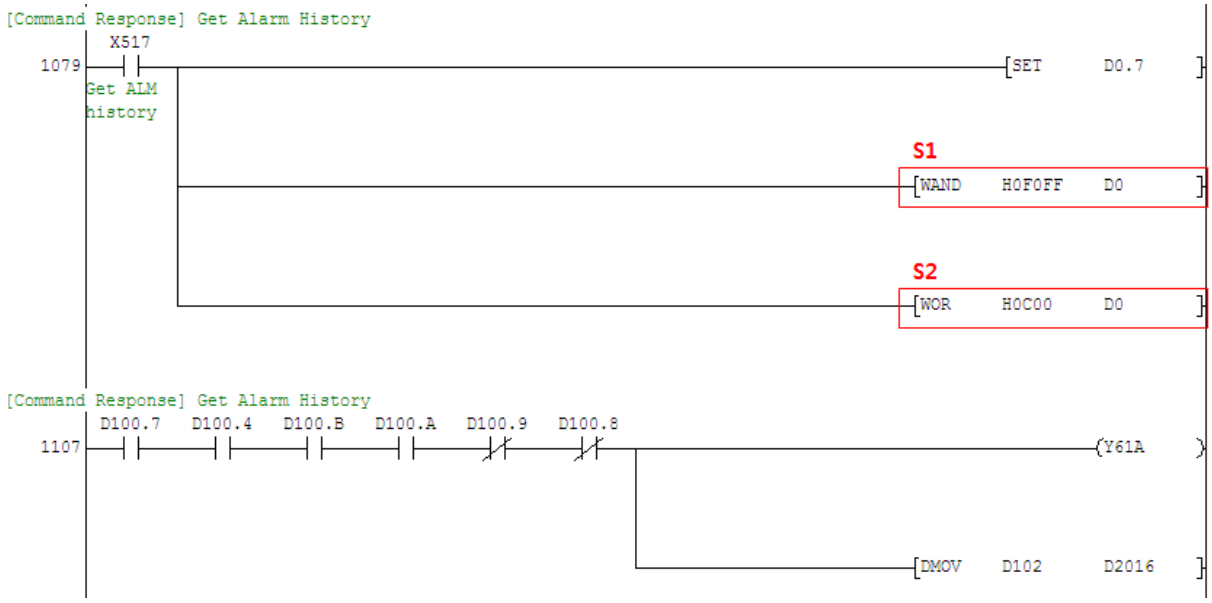
MOTION/SETTING_RESP bit = 1

CMD_CODE_RESP = 1100b

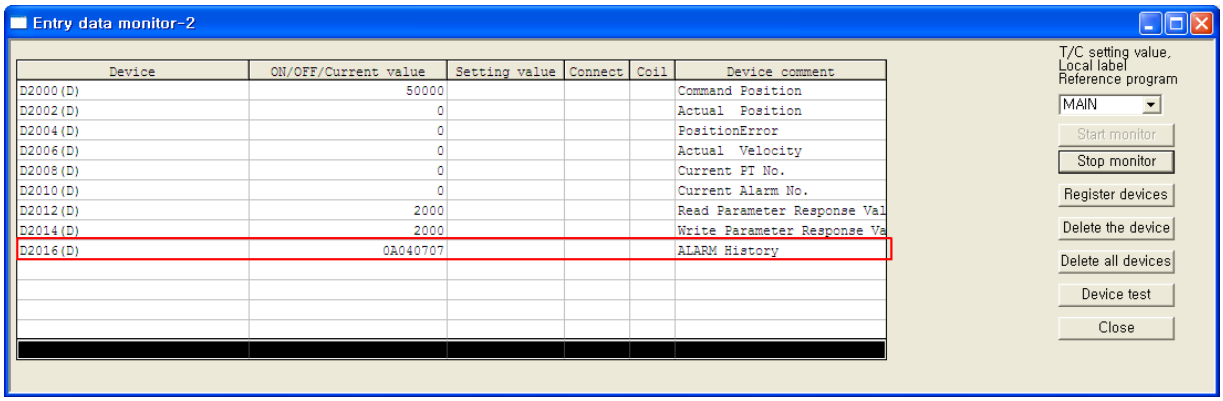
CMD_RESP bit = 1

RESPONSE_DATA = Alarm History

✓ **LADDER**



NOTE 1: The ladder of Example 26 is the added command to Example 25 and the contents of the previous example were omitted.



NOTE 2: This is the information received by running Example 26 for artificially occurred alarm.

NOTE 3: Alarm History shall be saved based on the alarm reset Command.

✓ **Command sequence**

① Set MOTION/SETTING Bit(Y0007) with Close input of X517 and change the IO-Map to Setting Mode status.

② Enter the command code '12' into CMD_CODE Area (D000.8~D000.B).

③ Refer to Example 10 and run the command when CMD_START Bit (D000.4) is ON.

④ Alarm History can be verified by the IO-Map combination of Alarm History command.

▶ The response of parameter save command is the N.O. input of MOTION/SETTING_RESP Bit value (X1007), the status value compared to CMD_CODE_RESP area (D100.8~D100.B) with '12', and the resulting value formed by AND circuit for CMD_RESP(D100.4).

⑤ This example will be saved as D2016 (command response verification) when the alarm history is executed normally.

⑥ The data obtained after running this command receives 4 data by hexadecimal type.

▶ The data of D2016.0~D2016.7 (0x07 : motor connection error) is the last occurred alarm information.

▶ The data of D2016.8~D2016.F (0x07 : motor connection error) is the second last occurred alarm information.

▶ The data of D2016.0~D2016.7 (0x04 : overload) is the third last occurred alarm information.

▶ The data of D2016.8~D2016.F (0x0A : encoder connection error) is the fourth last occurred alarm information.

■ Alarm History Initialization

Alarm History Initialization at the command code (CMD_CODE) '13' of the setting mode (MOTIONING/SETTING=1) status and verifies the alarm history occurred in the corresponding axis. Example 27 is the example for Alarm History verification of Axis-0.

Example 27. Alarm History initialization Command

✓ **Control Bit Map Information**

- **Input-Map**

  MOTION/SETTING – D000.7

  CMD_CODE – D000.8~D000.B

  CMD_START – D000.4

- **Output-Map**

  MOTION/SETTING_RESP – D100.7

  CMD_CODE_RESP – D100.8~D100.B

  CMD_ RESP – D100.4

✓ **IO Information**

- **Input information**

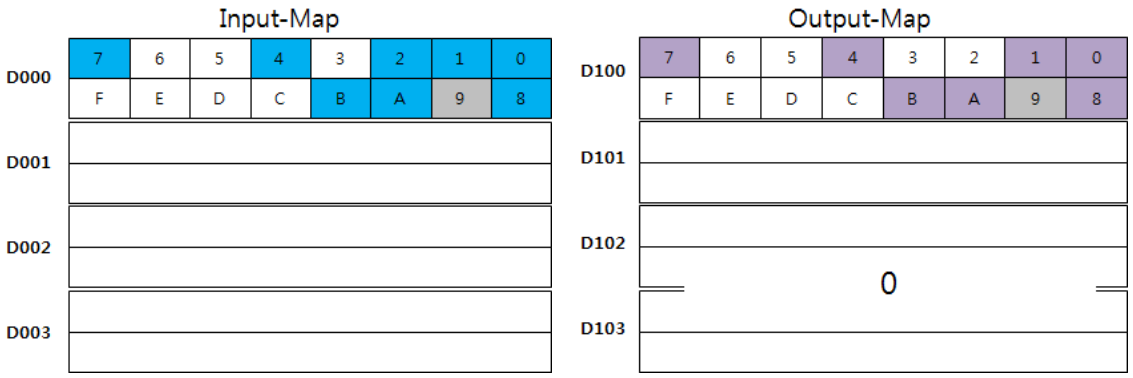
  Reset ALM His – X518

- **Output information**

  ALM His CLR Resp – Y61B

✓ **IO-Map Command and Response Type**

- **Run Alarm History initialization command**



MOTION/SETTING bit = 1

CMD_CODE = 1110b

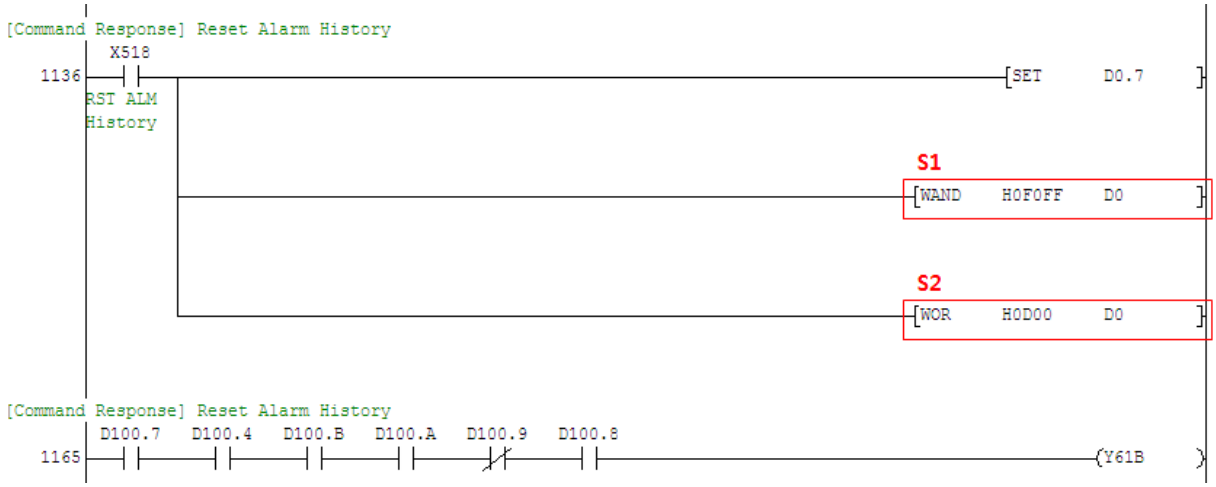
CMD_START bit = 1

MOTION/SETTING_RESP bit = 1

CMD_CODE_RESP = 1110b

CMD_RESP bit = 1

✓ **LADDER**



NOTE: The ladder of Example 27 is the added command to Example 26 and the contents of the previous example were omitted.

✓ **Command sequence**

① Set MOTION/SETTING Bit(D000.7) with Close input of X518 and change the IO-Map to Setting Mode status.

② Enter the command code '13' for CMD_CODE Area (D000.8~D000.B).

③ Refer to Example 10 and run the command when CMD_START Bit (D000.4) is ON.

④ After running this Command, the alarm history shall be cleared by 0x00, 0x00, 0x00, 0x00.

⑤ Alarm History can be verified by the IO-Map combination of the Alarm History initialization command.

▶ The response of parameter save command shall be the N.O input of MOTION/SETTING_RESP Bit value (X1007), the status value compared to CMD_CODE_RESP area (D100.8~D100.B) with '13', and the resulting value formed by AND circuit for CMD_RESP(D100.4).

5.2.10 MOTIONGATE Version Verification

MOTIONGATE version verification command can get the version information of MOTIONGATE in which axis the command is executed. This command operates at the command code (CMD_CODE) '5' of the setting mode (MOTIONING/SETTING=1) status. Example 28 demonstrates the version information request method of MOTIONGATE.

Example 28. MOTIONGATE version information request Command

✓ **Control Bit Map Information**

- **Input-Map**
  MOTION/SETTING – D000.7
  CMD_CODE – D000.8~D000.B
  CMD_START – D000.4
- **Output-Map**
  MOTION/SETTING_RESP – D100.7
  CMD_CODE_RESP – D1008~D100.B
  CMD_ RESP – D100.4

✓ **IO Information**

- **Input information**
  Read Ver Info – X519
- **Output information**
  Read Ver Resp – Y61C

✓ **IO-Map Command and Response Type**

- **Version information request Command**

Input-Map

	7	6	5	4	3	2	1	0
D000	F	E	D	C	B	A	9	8
D001								
D002								
D003								

Output-Map

	7	6	5	4	3	2	1	0
D100	F	E	D	C	B	A	9	8
D101								
D102	Release No.							
	Bug Fix							
D103	Minor Version							
	Major Version							

MOTION/SETTING bit = 1

CMD_CODE = 0101b

CMD_START bit = 1

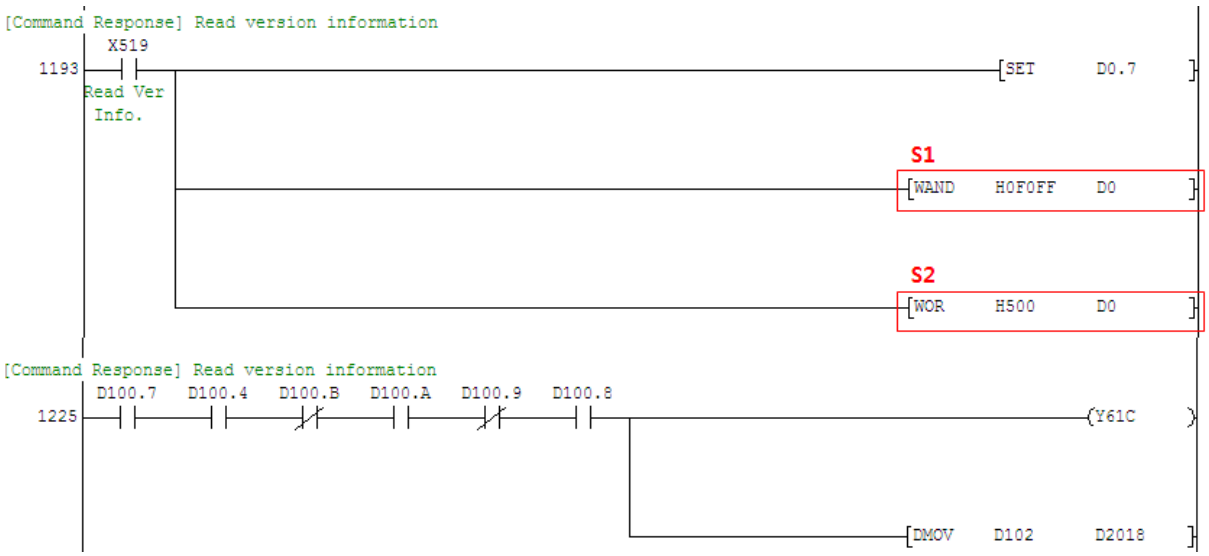
MOTION/SETTING_RESP bit = 1

CMD_CODE_RESP = 0101b

CMD_RESP bit = 1

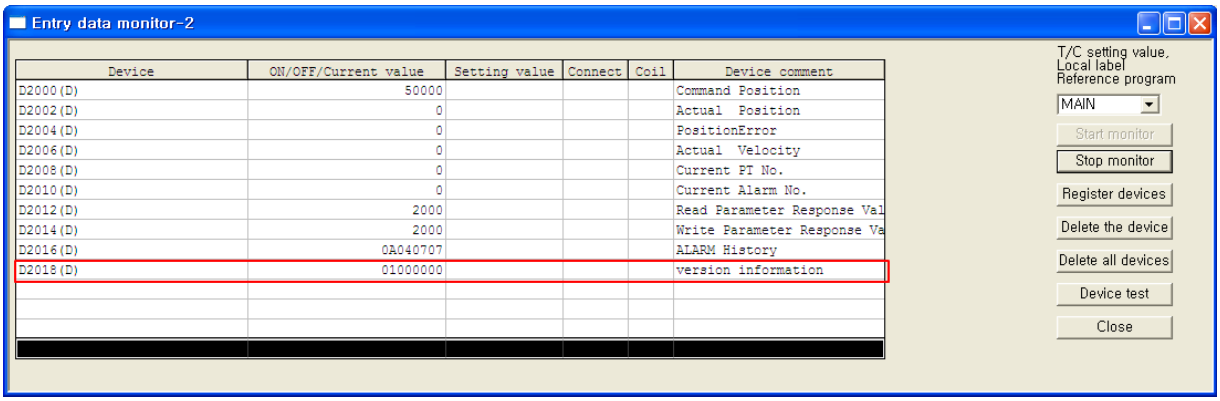
RESPONSE_DATA = Version Information

✓ **LADDER**



NOTE 1: The ladder of Example 28 is the added command to Example 27 and the contents of the previous example were omitted.

NOTE 2: Example 28 obtains the same information even if the version information request command is executed with all axes connected to the same MOTIONGATE.



✓ Command sequence

① Set MOTION/SETTING Bit(Y0007) with Close input of X50A and change the IO-Map to Setting Mode status.

② Enter the command code '5' into CMD_CODE Area (D000.8~D000.B).

③ Refer to Example 10 and run the command when CMD_START Bit (D000.4) is ON.

④ The response of MOTIONGATE version can be verified by IO-Map combination.

▶ The response of MOTIONGATE version verification command shall be the N.O. input of MOTION/SETTING_RESP Bit value (D100.7) which is the response bit of the corresponding IO-Map, the status value compared to CMD_CODE_RESP Area (D100.8~D100.B) with '5', and the resulting value formed by AND circuit for CMD_RESP (D100.4).

⑦ The data obtained after running this Command, receives 4 data by hexadecimal type. (The verified version in Example 28 is 1.0.0.0.)

▶ The data of D2018.0~D2018.7 is Release No.

▶ The data of D2018.8~D2018.F is Bug Fix. No.

▶ The data of D2019.0~D2019.7 is Minor Version.

▶ The data of D2019.8~D2019.F is Major Version.

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