

Ezi-SERVOII-EC Operation manual for

LS Mecapion < 'MXP' >



■ MXP EtherCAT Master component Confidential

❑ Check the contents of product and install the product when purchasing the MXP .

** MXP Download path : http://www.lsmecapion.com /contents/sub02/sub03_08.php

** Trial Version can supporting


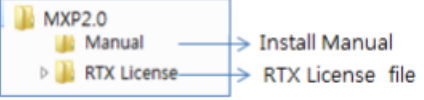


Component fig	Description
	Install Program USB /1EA. (The USB with LS Mecapion Logo printed.)  ** Please refer to the directory below Manual\Install
	MXP Lock key USB. (The USB with MXP product serial number attached)
	RTX Lock key USB. (The USB with MXP product serial number attached)
Manual	Installation manual

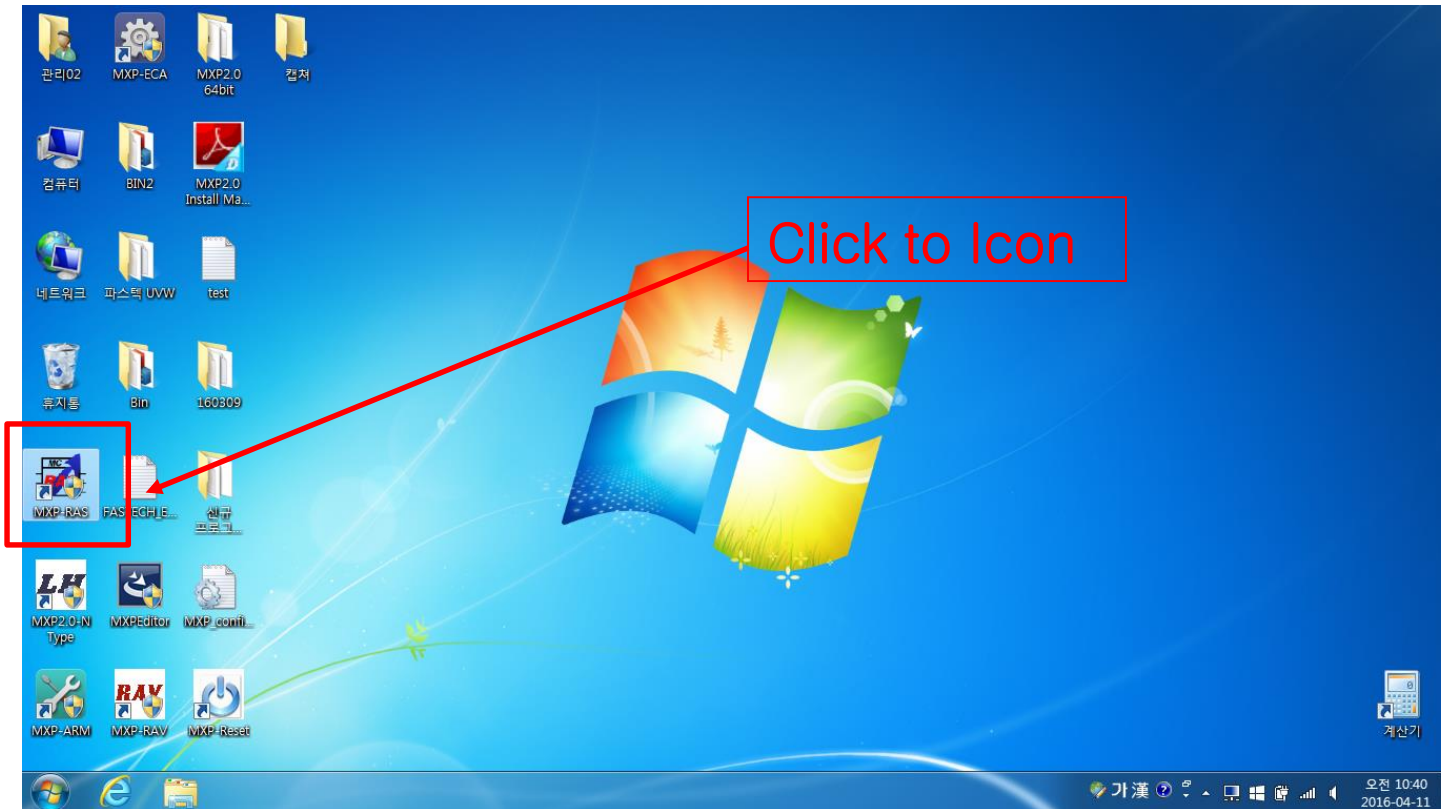
Table 3- Product Component

■ MXP-RAS execution – ENI file creation

Confidential

□ Start up by User authority after installed MXP-RAS program to PC

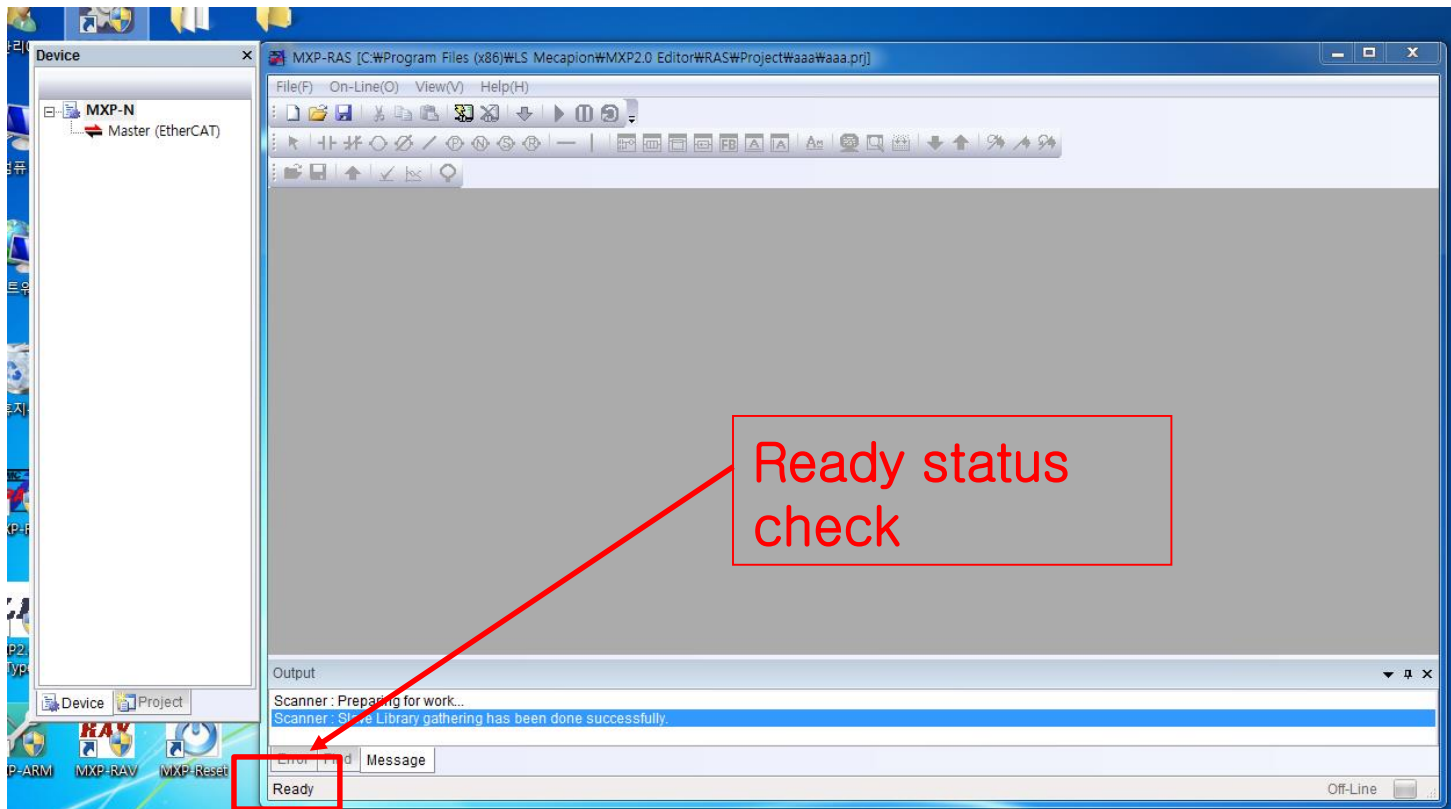
** ENI file creation (Registration of Slave status information)



■ MXP-RAS execution – ENI file creation

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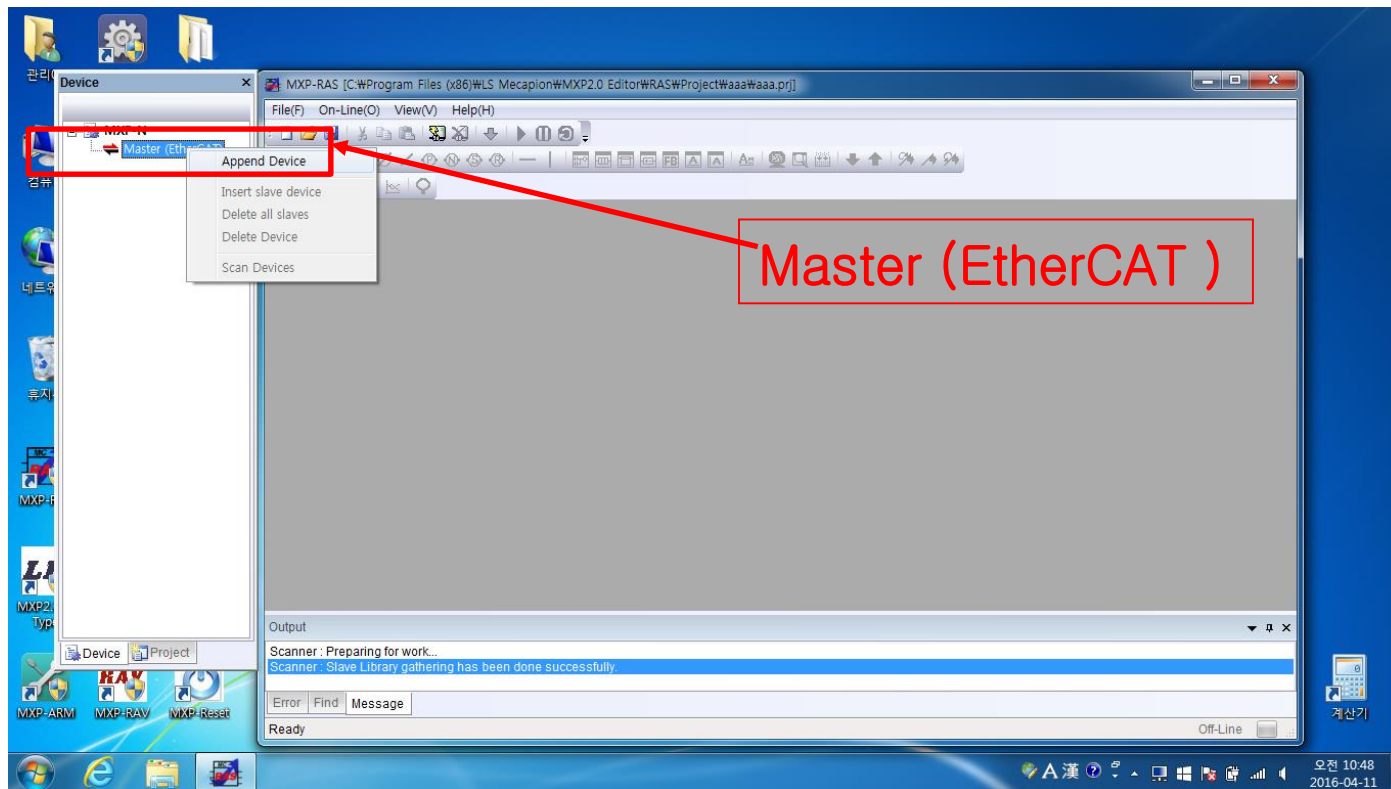
- ❑ Ready status check after MXP-RAS execution.
- ❑ Ready status can be delayed according to PC environment, please check ready status before progress to next step.



■ MXP-RAS execution – ENI file creation

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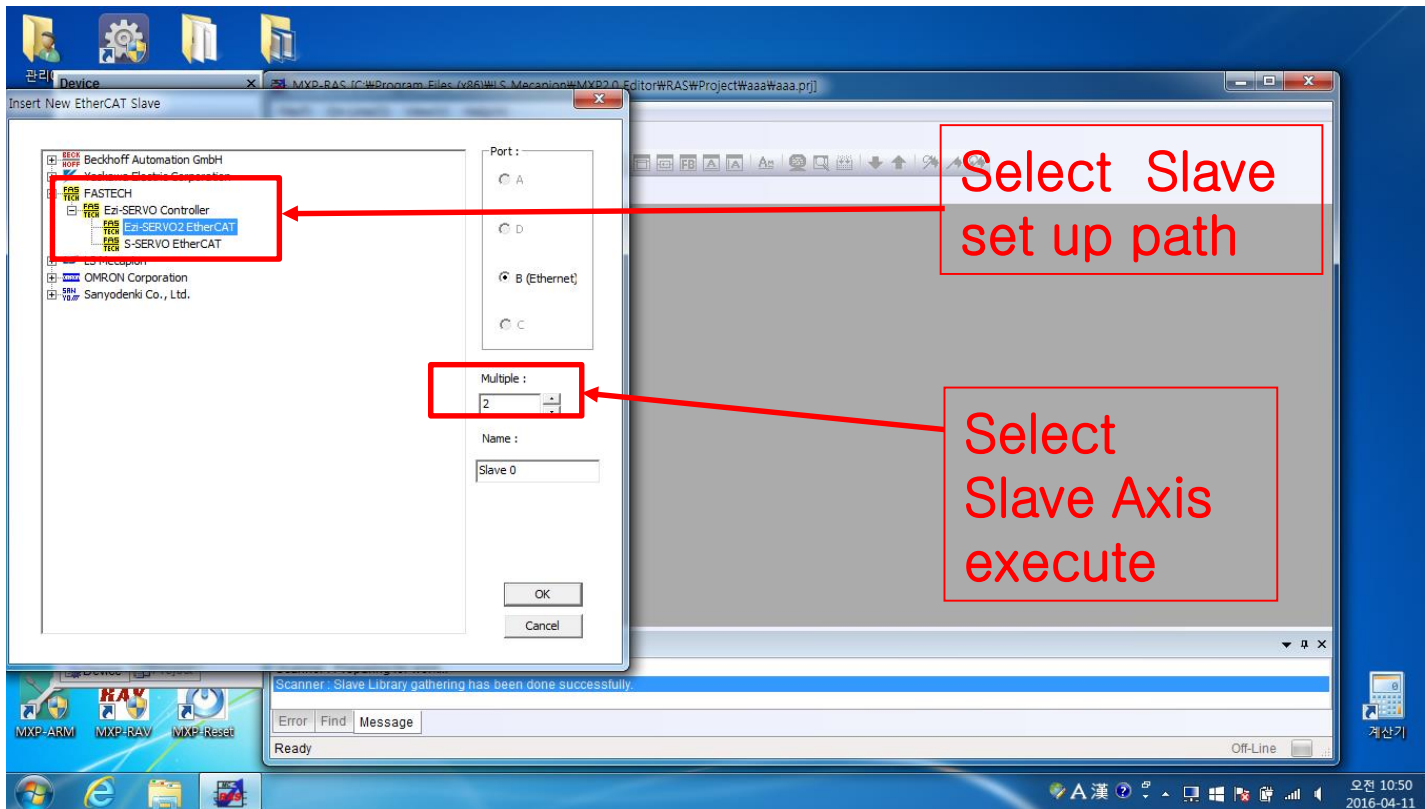
- ❑ Click to right button of mouse from the activated Master(EtherCAT) category.
- ❑ Select to Append Device



■ MXP-RAS execution – ENI file creation

Confidential

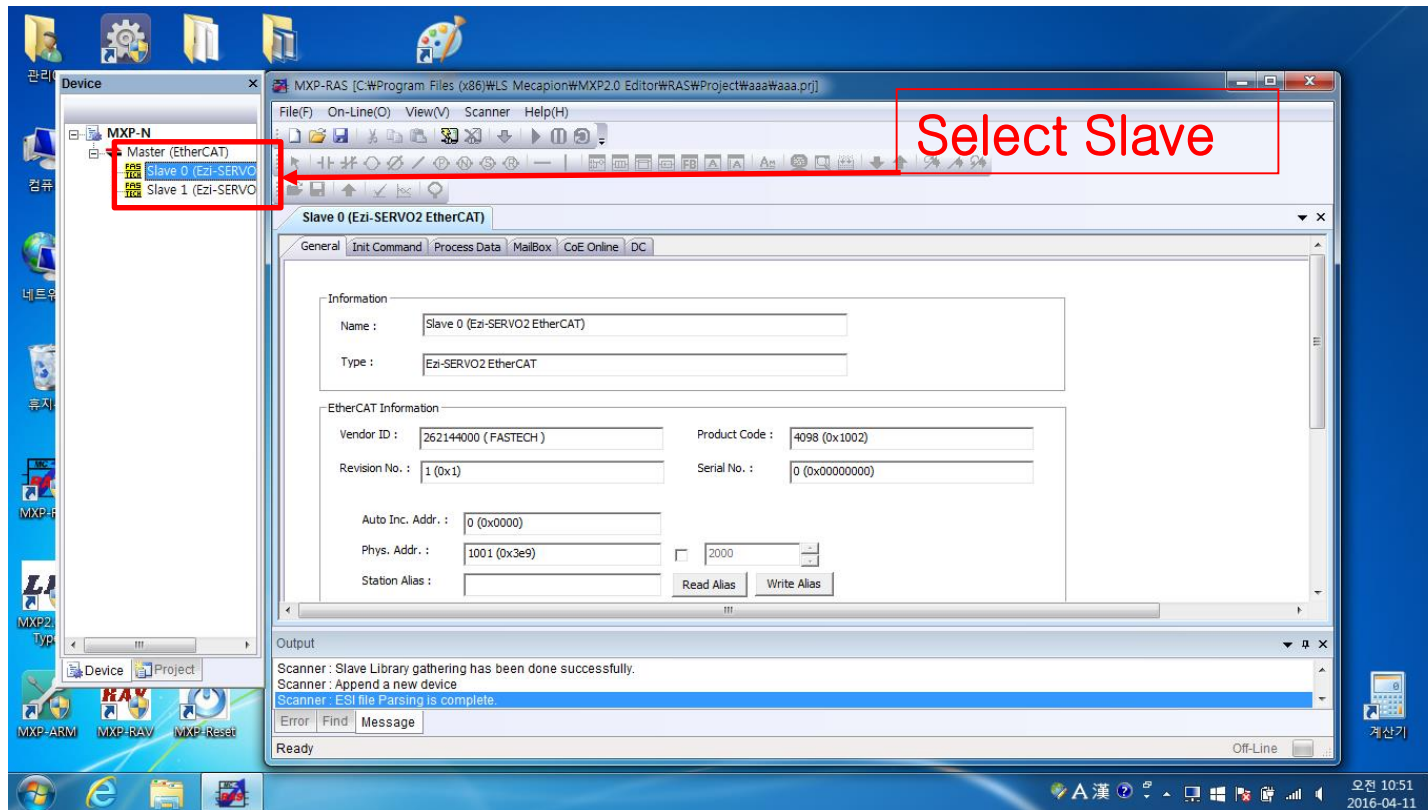
- Set up the path through by activated FASTECH -> Ezi-SERVO Controller -> Ezi-SERVO2 EtherCAT. And select to linked Slave Axis



■ MXP-RAS execution – ENI file creation

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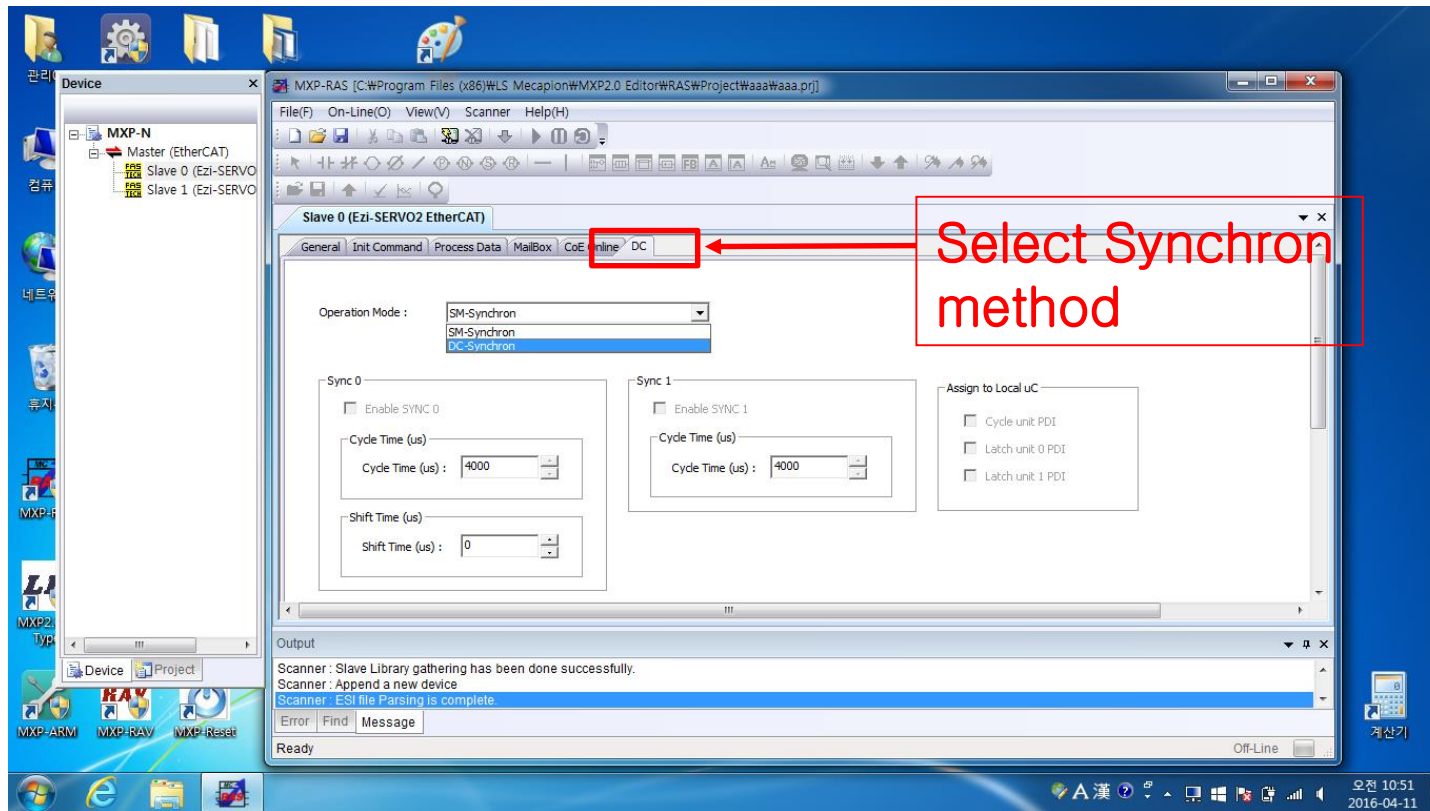
□ Mode setting for each slaves.



■ MXP-RAS execution – ENI file creation

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- ❑ Select DC Synchron from the SM Synchron, DC Synchron method
- ❑ Slave 0, 1 set up , all slave set up method is same.



■ MXP-RAS execution – ENI file creation

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- ❑ After setting Input from PDO List for PDO Mapping in Process Data , Confirm the default setting in PDO Contents below.

The screenshot shows the MXP-RAS software interface. The 'Process Data' tab is active, displaying the 'PDO Lists' section. A table lists PDOs with the following data:

Index	Size	Name	EM	Flag
0x1A00	6.0	Inputs	3	
0x1000	6.0	Outputs	2	

The 'PDO Contents (0x1A00)' section shows a table with the following data:

Index	Size	Units	Name	Type
0x6041:: 0	2.0	0.0	Status Word	UINT
0x6064:: 0	4.0	2.0	Actual Position	DINT
		6.0		

A red box highlights the 'PDO Lists' table, and another red box highlights the 'PDO Contents' table. A red callout box with arrows pointing to these tables contains the text: 'Input set up ** Default set up value can be checked.'

been done successfully.

Off-Line

오전 10:52
2016-04-11

■ MXP-RAS execution – ENI file creation

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- ❑ Right mouse button click on the below PDO Contents box for Input PDO Mapping .
- ❑ Click to Insert Item .

The screenshot shows the MXP-RAS software interface. On the left, a tree view shows the device hierarchy: MXP-N, Master (EtherCAT), Slave 0 (Ezi-SERVO), and Slave 1 (Ezi-SERVO). The main area displays the PDO List and PDO Contents (0x1A00) tables. A context menu is open over the PDO Contents table, with 'Insert Item' highlighted. A red arrow points from a text box to the 'Insert Item' option.

Index	Size	Name	SM	Flag
0x1A00	6.0	Inputs	3	
0x1600	6.0	Outputs	2	

Index	Size	Offs	Name	Type
0x6041: 0	2.0	0.0	Status Word	UINT
0x6064: 0	4.0	2.0	Actual Position	DINT
		6.0		

been done successfully.

Off-Line

오전 10:53
2016-04-11

Click to Insert Item

■ MXP-RAS execution – ENI file creation

Confidential

□ Select Object Dictionary . (ex. Digital Input)

**** Precaution :** When selectin the Object Dictionary , Input & opyput will appear in the window at the same time, When Assigning the input command to out put command , communication does not working normally.

Object Dictionary selection for use

Index	SubIdx	Name
0x60BA	0	Touch probe 1 positive value
0x60BB	0	Touch probe 1 negative value
0x60BC	0	Touch probe 2 positive value
0x60BD	0	Touch probe 2 negative value
0x60D5	0	Touch probe 1 positive edge counter
0x60D6	0	Touch probe 1 negative edge counter
0x60D7	0	Touch probe 2 positive edge counter
0x60D8	0	Touch probe 2 negative edge counter
0x60F4	0	Following error actual value
0x60FD	0	Digital inputs
0x60FE	1	Physical outputs
0x60FE	2	Bit mask

■ MXP-RAS execution – ENI file creation

Confidential

□ Select the necessary PDO for input in the same way.

The screenshot shows the MXP-RAS software interface. The main window is titled 'Slave 0 (Ezi-SERVO2 EtherCAT)'. On the left, a tree view shows the device hierarchy: MXP-N, Master (EtherCAT), Slave 0 (Ezi-SERVO), and Slave 1 (Ezi-SERVO). The main area displays two tables:

Index	Size	Name	SM	Flag
0x1A00	10.0	Inputs	3	
0x1B00	6.0	Outputs	2	

Below this is the 'PDO Contents (0x1A00):' table:

Index	Size	Offs	Name	Type
0x6041::0	2.0	0.0	Status Word	UBINT
0x6042::0	4.0	2.0	Actual Position	DINT
0x60FD::0	4.0	6.0	Digital inputs	UBINT
		10.0		

A red box highlights the 'Digital inputs' row in the PDO Contents table. A red arrow points from this box to a text box on the right that says 'Set up PDO value checking'. At the bottom of the interface, a status bar indicates 'been done successfully.' and 'Off-Line'. The system tray shows the time as 10:54 on 2016-04-11.

■ MXP-RAS execution – ENI file creation

Confidential

□ Select the necessary PDO for input in the same way.

**** ex) Selects the Digital input / Position actual value / Velocity actual value**

The screenshot shows the MXP-RAS software interface. The 'PDO List' table is as follows:

Index	Size	Name	SM	Flag
0x1A00	18.0	Inputs	3	
0x1600	6.0	Outputs	2	

The 'PDO Contents (0x1A00)' table is highlighted with a red box and contains the following data:

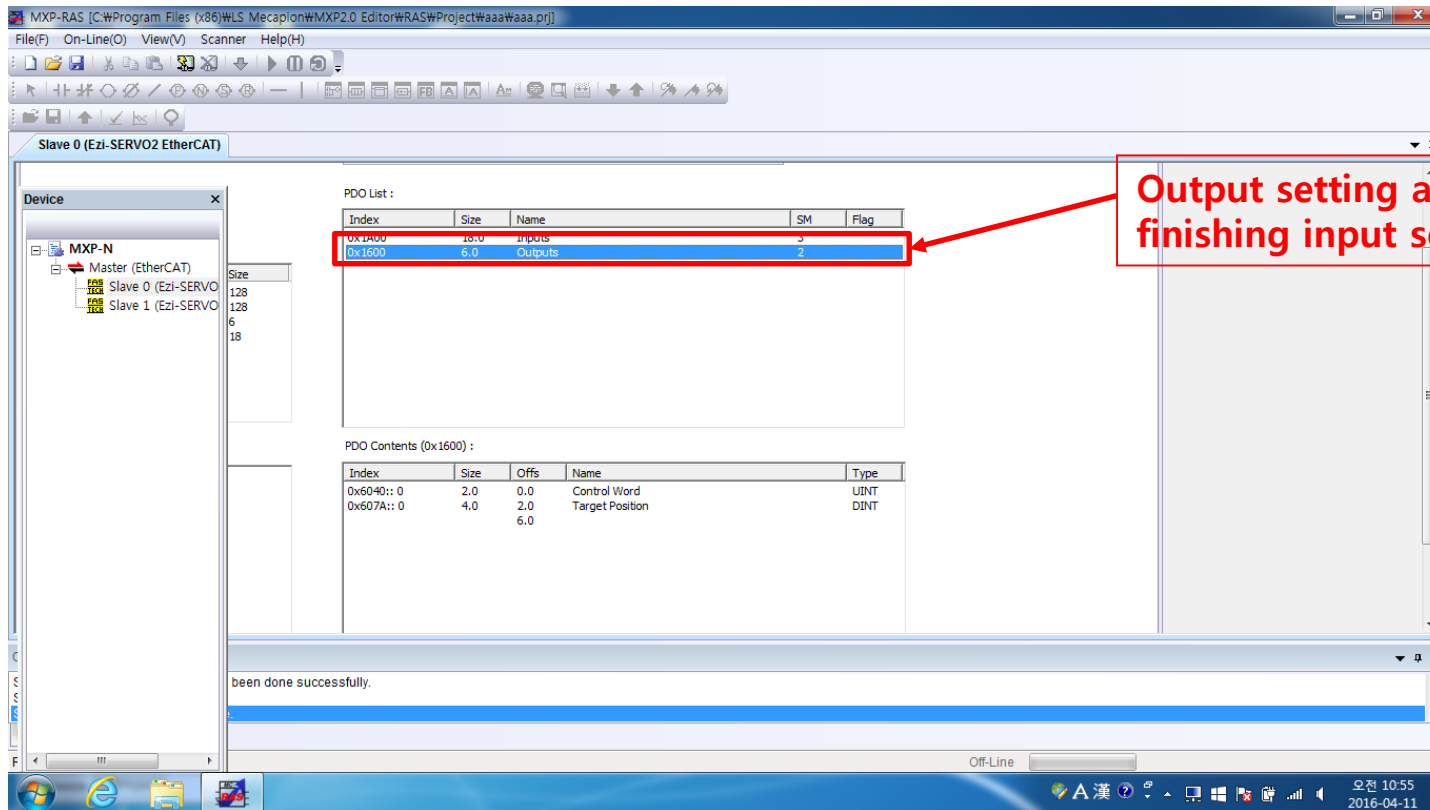
Index	Size	Offs	Name	Type
0x6041::0	2.0	0.0	Status Word	UINT
0x6064::0	4.0	2.0	Actual Position	DINT
0x60FD::0	4.0	6.0	Digital inputs	UDINT
0x6064::0	4.0	10.0	Position actual value	DINT
0x606C::0	4.0	14.0	Velocity actual value	DINT

A red arrow points from a text box labeled 'Set up PDO value checking' to the 'PDO Contents (0x1A00)' table. The status bar at the bottom indicates 'Off-Line' and 'been done successfully.' The system tray shows the date and time as '2016-04-11' and '오전 10:55'.

■ MXP-RAS execution – ENI file creation

Confidential

- ❑ After Input settings finished, click on the top of the PDO List for the Output Settings.



Slave 0 (Ezi-SERVO2 EtherCAT)

Device

- MXP-N
 - Master (EtherCAT)
 - Slave 0 (Ezi-SERVO)
 - Slave 1 (Ezi-SERVO)

Size

- 128
- 128
- 6
- 18

PDO List :

Index	Size	Name	SM	Flag
0x1A00	16.0	Inputs	3	
0x1600	6.0	Outputs	2	

PDO Contents (0x1600) :

Index	Size	Offs	Name	Type
0x6040:: 0	2.0	0.0	Control Word	UINT
0x607A:: 0	4.0	2.0	Target Position	DINT
		6.0		

been done successfully.

Off-Line

오전 10:55
2016-04-11

Output setting after finishing input set up

■ MXP-RAS execution – ENI file creation

Confidential

- ❑ Click to right mouse button on the PDO Contents
 - ❑ List checking after selecting the necessary Output .
- ** Precaution : Communication does not work when click to Input range of Contents .**

The screenshot shows the MXP-RAS software interface. The main window displays the configuration for 'Slave 0 (Ezi-SERVO2 EtherCAT)'. The 'PDO Lists' section shows a table with the following data:

Index	Size	Name	SM	Flag
0x1A00	18.0	Inputs	3	
0x1600	10.0	Outputs	2	

The 'PDO Contents (0x1600)' section shows a table with the following data:

Index	Size	Offs	Name	Type
0x6040:: 0	2.0	0.0	Control Word	UINT
0x607A:: 0	4.0	2.0	Target Position	DINT
0x60FE:: 1	4.0	6.0	Physical outputs	UDINT

A red box highlights the 'PDO Contents (0x1600)' table, and a red arrow points to it from the text 'Output setting'.

■ MXP-RAS execution – ENI file creation

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❑ After PDO Mapping complete , then click the top of the Scanner to save the file to the ENI.

❑ Click to Export ENI File.

The screenshot shows the MXP-RAS software interface. The 'Scanner' menu is open, and the 'Export ENI File' option is highlighted. A red arrow points from the 'Export ENI File' option to a red box labeled 'Click' in the main window. The main window displays the 'Slave 0 (Ezi-SERVO2 EtherCAT)' configuration page. The 'PDO Lists' section shows a table with the following data:

Index	Size	Name	SM	Flag
0x1A00	18.0	Inputs	3	
0x1600	10.0	Outputs	2	

The 'PDO Contents (0x1600)' section shows a table with the following data:

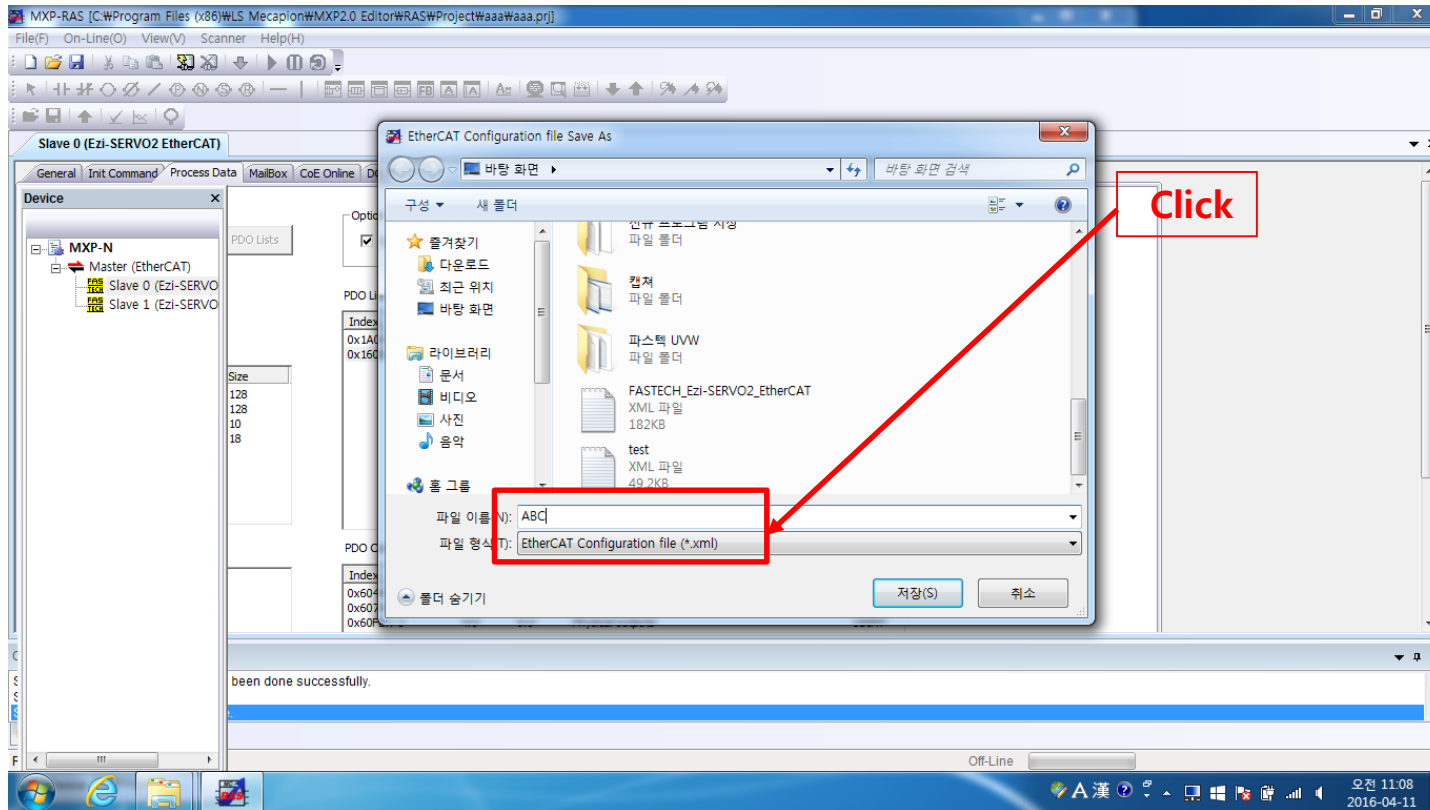
Index	Size	Offs	Name	Type
0x6040:: 0	2.0	0.0	Control Word	UINT
0x607A:: 0	4.0	2.0	Target Position	DINT
0x60FE:: 1	4.0	6.0	Physical outputs	UDINT

The status bar at the bottom of the window indicates 'Off-Line' and 'been done successfully.' The system tray shows the date and time as '오전 10:58 2016-04-11'.

■ MXP-RAS execution – ENI file creation

Confidential

□ Save the ENL file as EtherCAT Configuration file (*.xml) format.

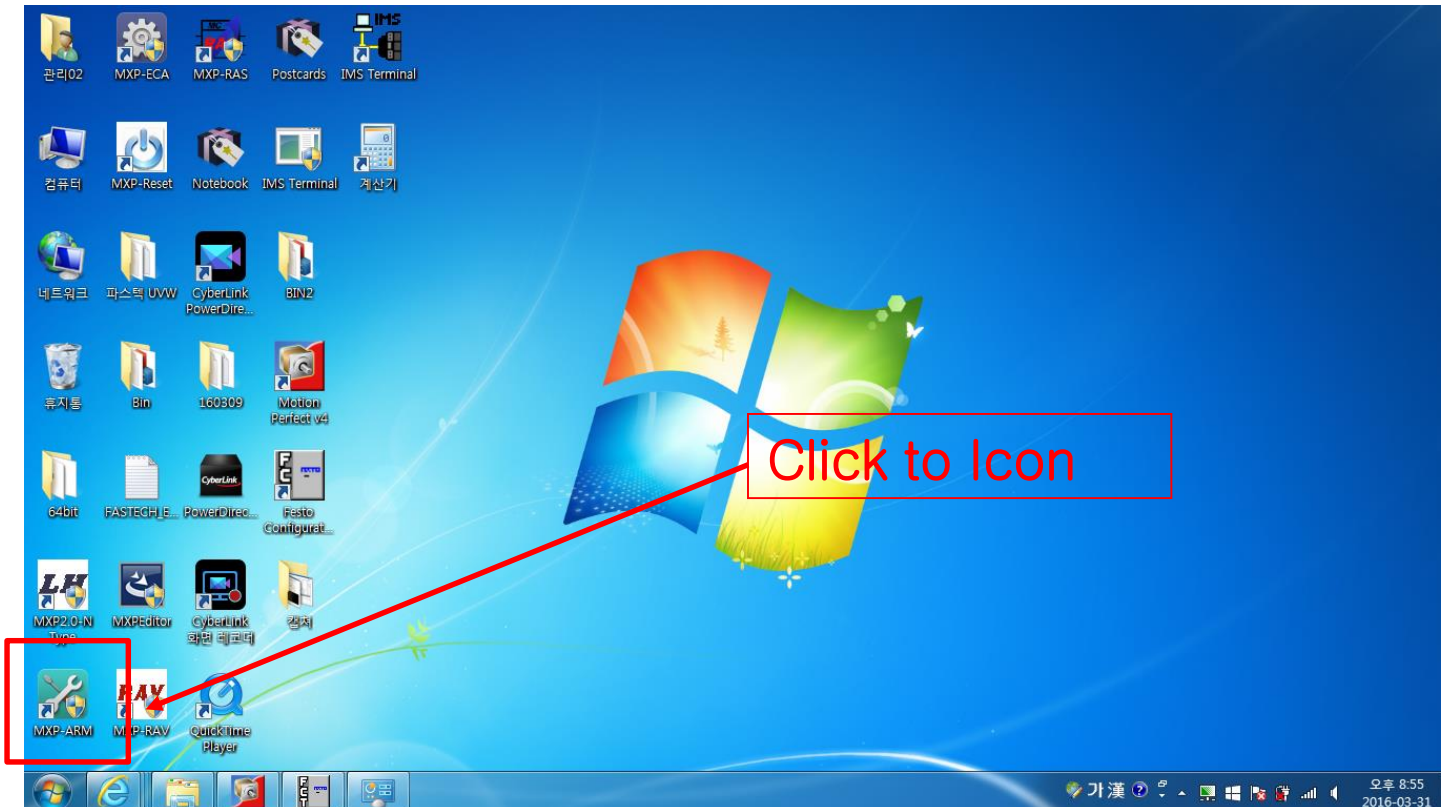


■ MXP-ARM execution

Confidential

□ Start up by User authority after installed MXP-ARM program to PC

** Trial Version can supporting

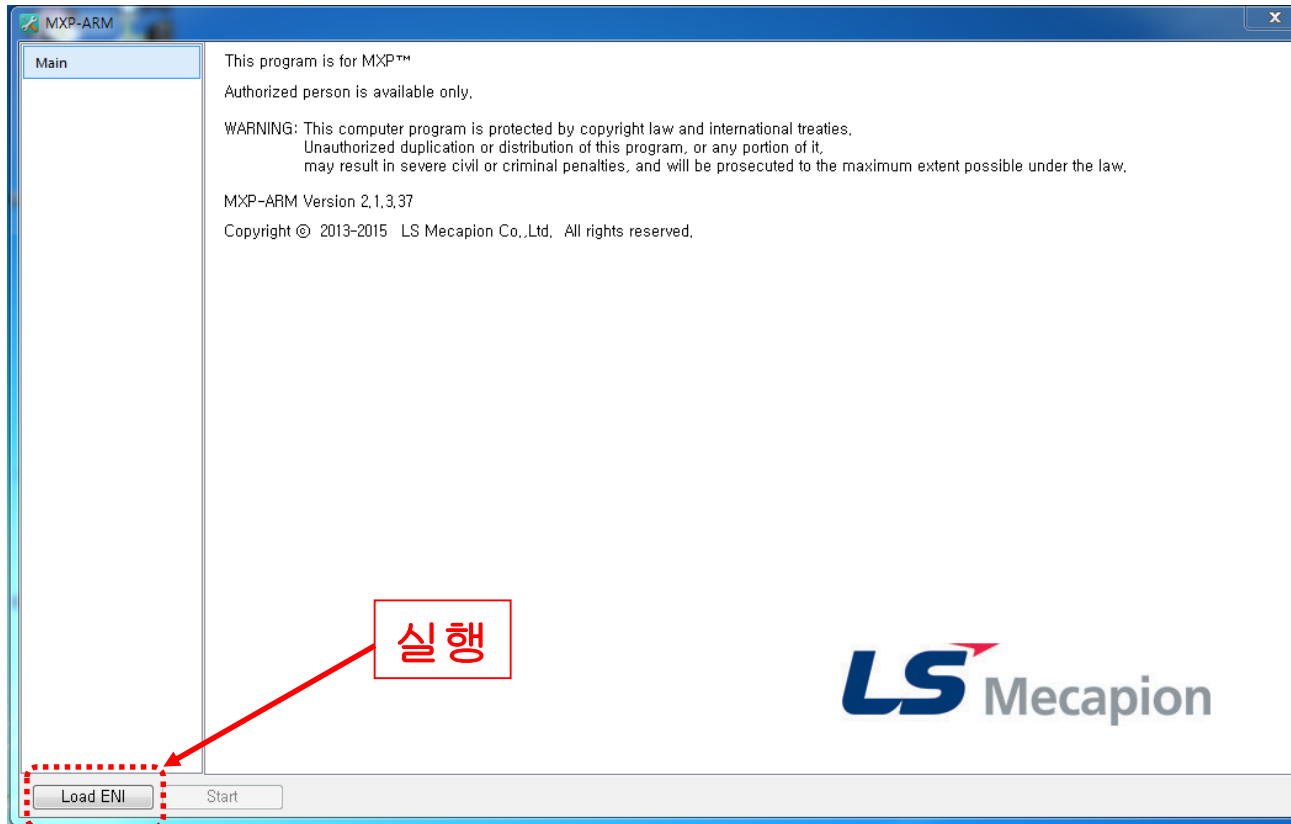


■ Load ENI

Confidential

□ Click to 'Load ENI' button

- ** Recreation needed whenever changing the allocated Slave axes and equipment APP. Environment.
- ** Loading the pre-built ENI file .

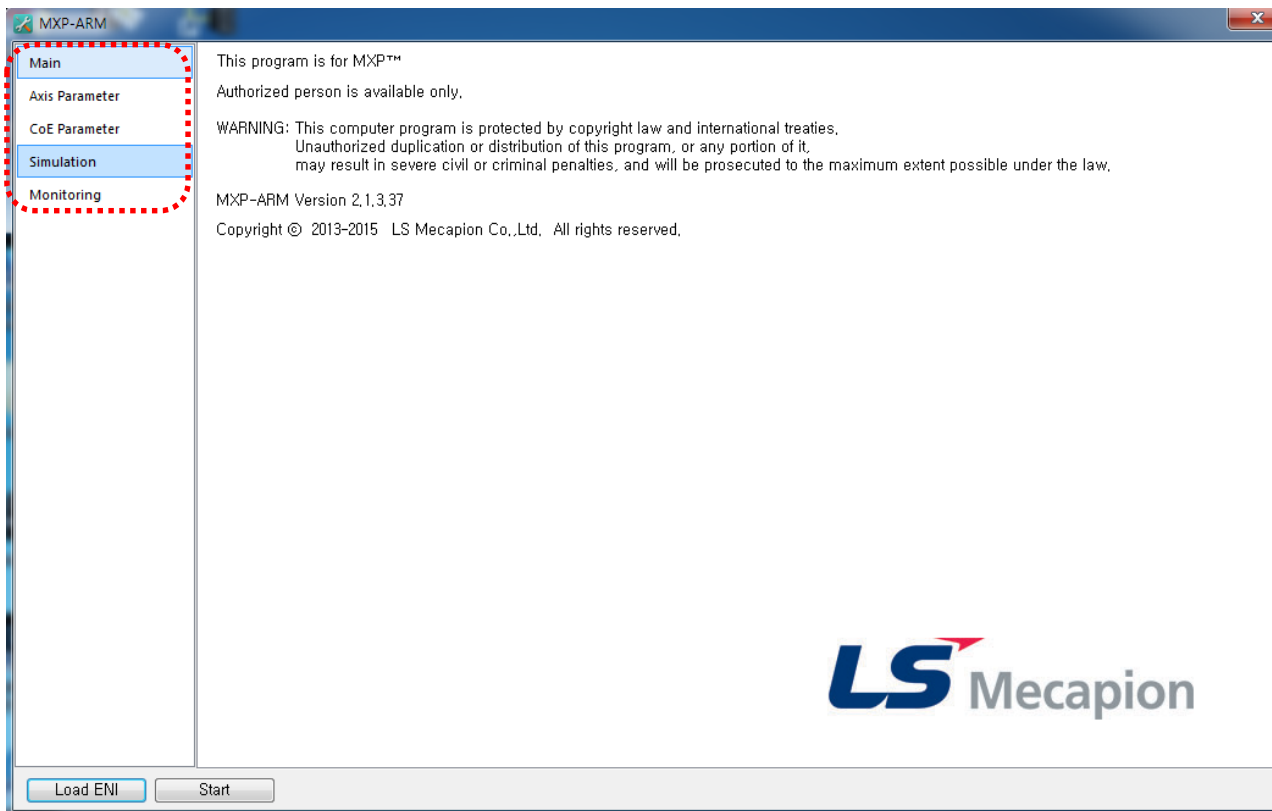


■ Verifying communication connection

Confidential

□ 5 Categories are created as left window status when communication connection is normal status between MXP Master, Ezi-SERVOII-EC Slave .

** If power is not supplied and Salve Cable is not connected normally, categories are not created (Restart required after checking)



1. Axis Parameter

Confidential

- ❑ Node devices created when Axis Parameter execution, Master to connect to devices & searched Slave information can be checked .

**** Scan for Slave Drive**

The screenshot displays the MXP-ARM software interface. On the left, a navigation pane shows 'Main' selected, with 'Axis Parameter' highlighted. The main area is divided into two panes: 'Node devices' and 'EtherCAT parameter'. The 'Node devices' pane lists five items: 1. System (A), 2. Master (EtherCAT), 3. Slave 0 (Ezi-SERVO2 Ether), 4. Slave 1 (Ezi-SERVO2 Ether), and 5. Slave 2 (Ezi-SERVO2 Ether). The 'EtherCAT parameter' pane contains a table with the following data:

Item	Value	MAC address
1 Master Activation	Used	
2 Master Communication Cycle[0.1ms]	40	
3 Master ENI XML File Name	fastech_3UVW_4m_DC.xml	
4 Mac address	Realtek PCIe GBE Family Controller	b870f41831ee5

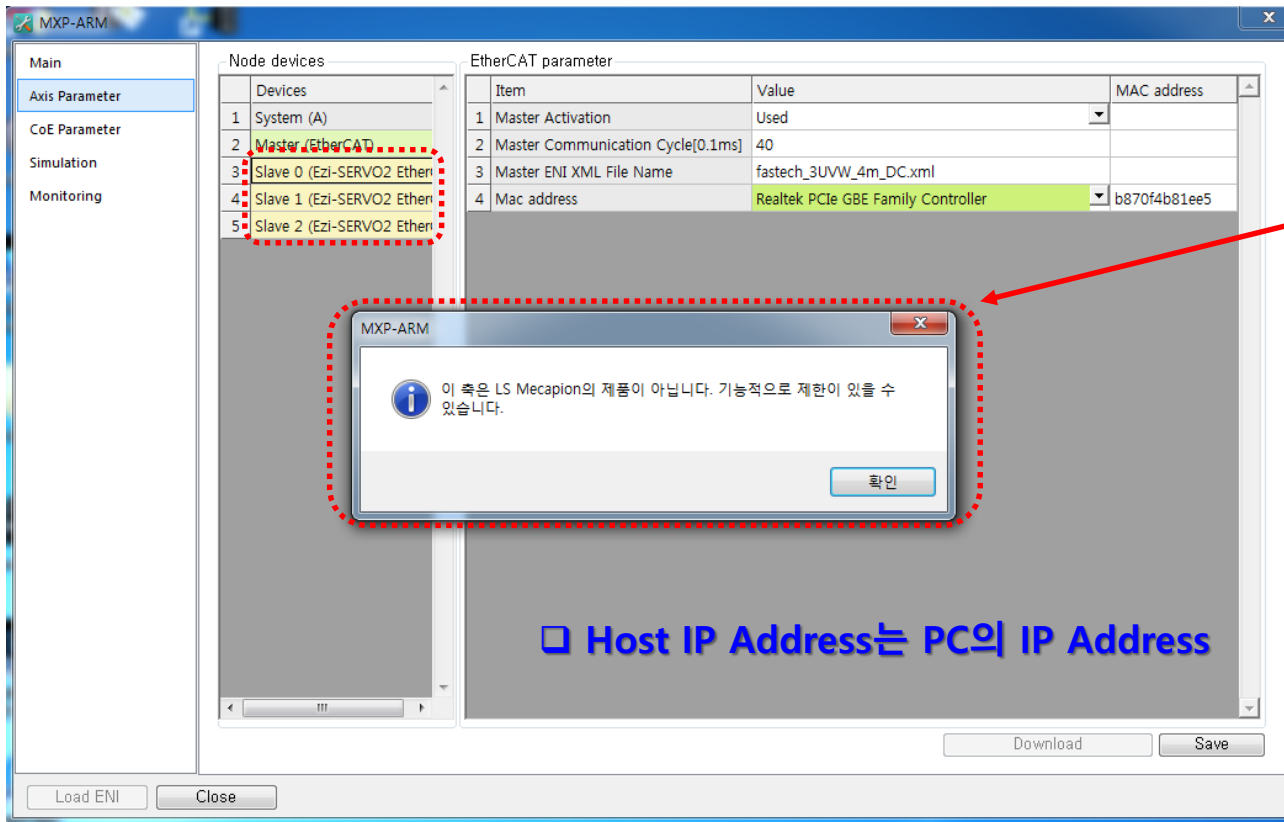
At the bottom of the window, there are buttons for 'Load ENI', 'Close', 'Download', and 'Save'.

Mac address :
It is possible to check Lan Card information of using PC

1. Axis Parameter [Slave Scan]

Confidential

❑ When running the Scan Slave, it will generate a warning window, as shown in the figure, This warning window will be floating when use of Ezi-SERVOII-EtherCAT Slave of FASTECH. It is not a problem in the Test



Warning message when using the other product not to use the LS MECAPION Slave

1. Axis Parameter

Confidential

- ❑ Pre-built the ENI file for application based on XML information (Information checking)

Mechanics information such as Ballscrew & Motor Encoder Resolution can be checked

MXP-ARM

Main

- Axis Parameter
- CoE Parameter
- Simulation
- Monitoring

Node devices

- 1 System (A)
- Master (EtherCAT)
- Slave 0 (Ezi-SERVO2 EtherCAT)
- Slave 1 (Ezi-SERVO2 EtherCAT)
- Slave 2 (Ezi-SERVO2 EtherCAT)

Slave 0 (Ezi-SERVO2 EtherCAT) Revision : 1

Type	Item	Value	Default	Unit
General				
100	B Activation	Used	Unused	
101	W System Position Unit	mm		mm
102	W System Velocity Unit	/s		/s
103	W Position Precision Unit	1		1
104	W Velocity Precision Unit	1		1
105	L Acceleration	10000	10000	FU^2
106	L Deceleration	10000	10000	FU^2
107	L Jerk Limit	50000	50000	FU^3
108	L Servomotor Gear Ratio	1		1
109	L Machine Gear Ratio	1		1
110	L Travel Distance Per Machine Rotation	1	10	PU/Rev
111	L Encoder Resolution	16000	524288	
112	W Axis Control Mode	C.S.P	C.S.P	
113	B Modulo Axis Set	Unused	Unused	
114	L Modulo Position Max	1		1 PU
Safety				
200	L Max Speed Setting	500	500	FU
201	L Rated Motor Speed Setting	3000	3000	r/min
202	B Software Limit Enable	Unused	Unused	
203	L Negative Software Limit	0		0 PU
204	L Positive Software Limit	0		0 PU
205	B Hardware Limit Enable	Used	Unused	

Download Save

Load ENI Close

2. COE Parameter

Confidential

❑ FASTECH Ezi-SERVOII-EtherCAT Drive COE information checking

The screenshot shows the MXP-ARM software interface. On the left, a 'Main' menu has 'CoE Parameter' selected. The 'Node Axis' section lists three slave units. The main area displays a table of parameters for 'ENI Rev : 1, ESI Rev : 1'. A red dashed box highlights the 'Value' column, and a red arrow points to the '0' value in the row for 'Device name' (Index 0X1008). At the bottom, the 'All Axis Dump' button is highlighted with a red dashed box and a red arrow.

Value	Index	Sub	Item	Type	
0	0X1000	00	Device type	UDINT	RO
0	0X1001	00	Error register	USINT	RO
0	0X1008	00	Device name	STRING	RO
0	0X1009	00	Hardware version	STRING...	RO
0	0X100A	00	Software version	STRING...	RO
0	0X1010	00	Store parameters	DT1010	RO
0	0X1011	00	Restore default parameters	DT1011	RO
0	0X1018	00	Identity	DT1018	RO
0	0X10F0	00	Backup parameter handling	DT10F0	RO
0	0X10F1	00	Error Settings	DT10F1	RO
0	0X10F3	00	Diagnosis History	DT10F3	RO
0	0X1600	00	RxPDO-Map0	DT1600	RO
0	0X1601	00	RxPDO-Map1	DT1600	RO
0	0X1A00	00	TxPDO-Map0	DT1A00	RO
0	0X1A01	00	TxPDO-Map1	DT1A00	RO
0	0X1C00	00	Sync manager type	DT1C00	RO
0	0X1C12	00	RxPDO assign	DT1C12	RO
0	0X1C13	00	TxPDO assign	DT1C13	RO
0	0X1C32	00	SM output parameter	DT1C32	RO
0	0X1C33	00	SM input parameter	DT1C33	RO
0	0X2001	00	Sensor logics	USINT	RW

Value : status before reading the stored information of Drive

All Axis Dump : Transfer command to Master PC for stored information of Drive

2. COE Parameter

Confidential

❑ Slave Drive information activating & checking

The screenshot shows the 'CoE Parameter' window in the MXP-ARM software. On the left, a sidebar contains 'Main', 'Axis Parameter', 'CoE Parameter', 'Simulation', and 'Monitoring'. The 'CoE Parameter' section is active, displaying a table of parameters for three slave drives (Slave 0, Slave 1, Slave 2). The table has columns for 'Device', 'Value', 'Index', 'Sub', 'Item', 'Type', and 'RW'. A red dashed box highlights the 'Value' column. A red arrow points from a text box on the right to the value '1' in the 'Start speed' row (Index 0X2006).

Device	Value	Index	Sub	Item	Type	RW
1 Slave 0 (Ezi-SERVO2 EtherCAT)	0	0X2003	00	Limit stop method	USINT	RW
2 Slave 1 (Ezi-SERVO2 EtherCAT)	16000	0X2005	00	Encoder resolution	UDINT	RO
3 Slave 2 (Ezi-SERVO2 EtherCAT)	1	0X2006	00	Start speed	UINT	RW
	10	0X2007	00	Run current	USINT	RW
	0	0X2008	00	Boost current	USINT	RW
	5	0X2009	00	Stop current	USINT	RW
	126	0X200A	00	Motor number	UINT	RO
	16000	0X200C	00	Reference Resolution	UDINT	RW
	3	0X200D	00	Position control gain	USINT	RW
	0	0X200E	00	In-position mode	USINT	RW
	200	0X2010	00	Brake delay	UINT	RW
	0	0X2011	00	Digital input levels	UINT	RW
	0	0X2012	00	Digital output levels	UINT	RW
	0	0X603F	00	Error code	UINT	RO
	0	0X6040	00	Control Word	UINT	RW
	561	0X6041	00	Status Word	UINT	RO
	2	0X605A	00	Quick stop option code	INT	RW
	0	0X605B	00	Shutdown option code	INT	RW
	1	0X605C	00	Disable operation option code	INT	RW
	2	0X605D	00	Halt option code	INT	RW
	2	0X605E	00	Fault reaction option code	INT	RW

Value : Stored information of Drive activating complete

3. Simulation

Confidential

❑ Motion Test after communication activating

** Executing the ALL Servo On

The screenshot shows the MXP-ARM software interface. On the left, a sidebar contains 'Main', 'Axis Parameter', 'CoF Parameter', 'Simulation' (highlighted with a red dashed box), and 'Monitoring'. The main window is titled 'Axis based on ENI' and displays three axes: 'Slave 0 (Ezi-SERVO)', 'Slave 1 (Ezi-SERVO)', and 'Slave 2 (Ezi-SERVO)'. The 'Slave 0' control panel is active, showing a 'System' section with buttons for 'Default', 'Svo On', 'Svo Off', 'Home', 'Reset', 'Servo On' (highlighted with a red dashed box and a red arrow), 'Svo Off', 'Reset', 'Home', and 'All Auto Motion'. Below this is a 'Status' table with columns for 'On/Off', 'Vel(mm/s)', 'Pos(mm)', 'Torque', 'Alarm', 'ErrID', 'Motion Status', and 'NOTHOM POT'. The 'Auto Motion' section includes 'Mode' (with checkboxes for 'Repeat', 'Start', 'Stop'), 'Common' (with 'Acc/Dec' and 'Jerk(0~)' set to 0.00), and 'ABS/REL Motion' (with 'Absolute' and 'Relative' options, and 'Pos(mm)' and 'Vel(mm/s)' set to 0.00). The 'Motion Monitoring' section shows 'Setting' (SCALE SET, Stop, +, -), 'Focusing' (X-axis (s) MIN 0, MAX 0), and 'Y-axis (Pos Unit/s) MIN 0, MAX 0'. A large green grid is visible at the bottom of the interface.

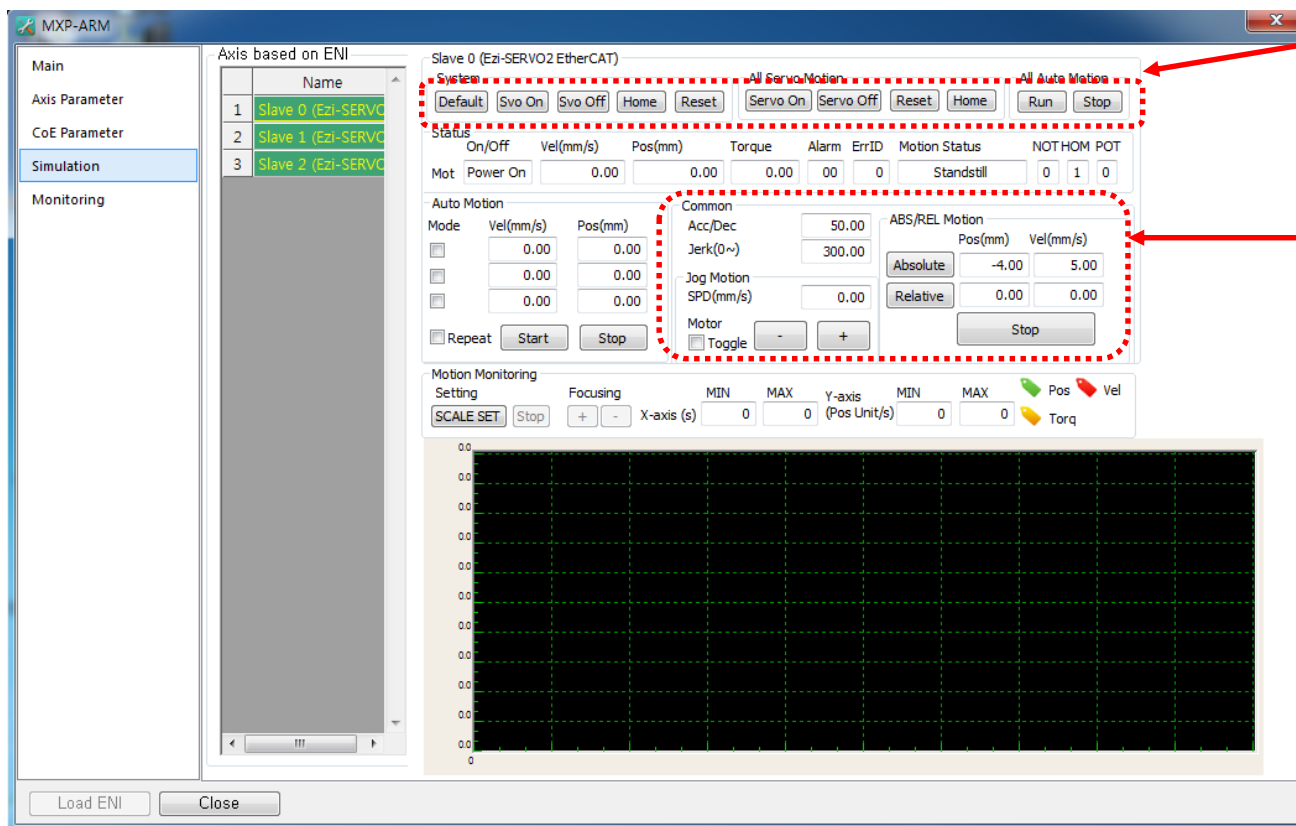
Ezi-SERVOII-EtherCAT
Slave ALL SERVO ON

3. Simulation [Command activating]

Confidential

❑ SERVO ON & Homing (Click to Home command)

** Velocity input according to saved Screw information when ENI creation
Motion test : Common single axis transfer information input



Command activation
Execute the homing
Click to Home button

Common :
Acc/Dec input : 50%
Jerk value input : 300
Vel value input : 5
(2.5revolution)
(Screw 2mm)
Absolute movement

3. Simulation [Command activating]

Confidential

❑ Motion monitoring by Scale Setting

** Position and Velocity graphs can be checked according to the PDO Mapping

The screenshot displays the MXP-ARM software interface. The main window is titled "Axis based on ENI" and shows a table with two rows: "Slave 0 (Ezi-SERVO)" and "Slave 1 (Ezi-SERVO)". The "Slave 0" row is selected. The "Motion Monitoring" section is active, showing a "SCALE SET" button and a "Stop" button. The "Motion Monitoring" section also displays a graph with a red dashed box around it. The graph shows position (Pos) and velocity (Vel) over time. The Y-axis ranges from -300.0 to 300.0, and the X-axis ranges from 0 to 150. The graph shows a green line for position and a red line for velocity. The position starts at 0, moves to approximately 200, then returns to 0, and then moves to approximately 100. The velocity starts at 0, moves to approximately 100, then returns to 0, and then moves to approximately 100. The "SCALE SET" button is highlighted with a red dashed box, and a red arrow points to it from the text "Scale SET function". Another red arrow points to the graph from the text "Position & Velocity graph can be checked".

Scale SET function

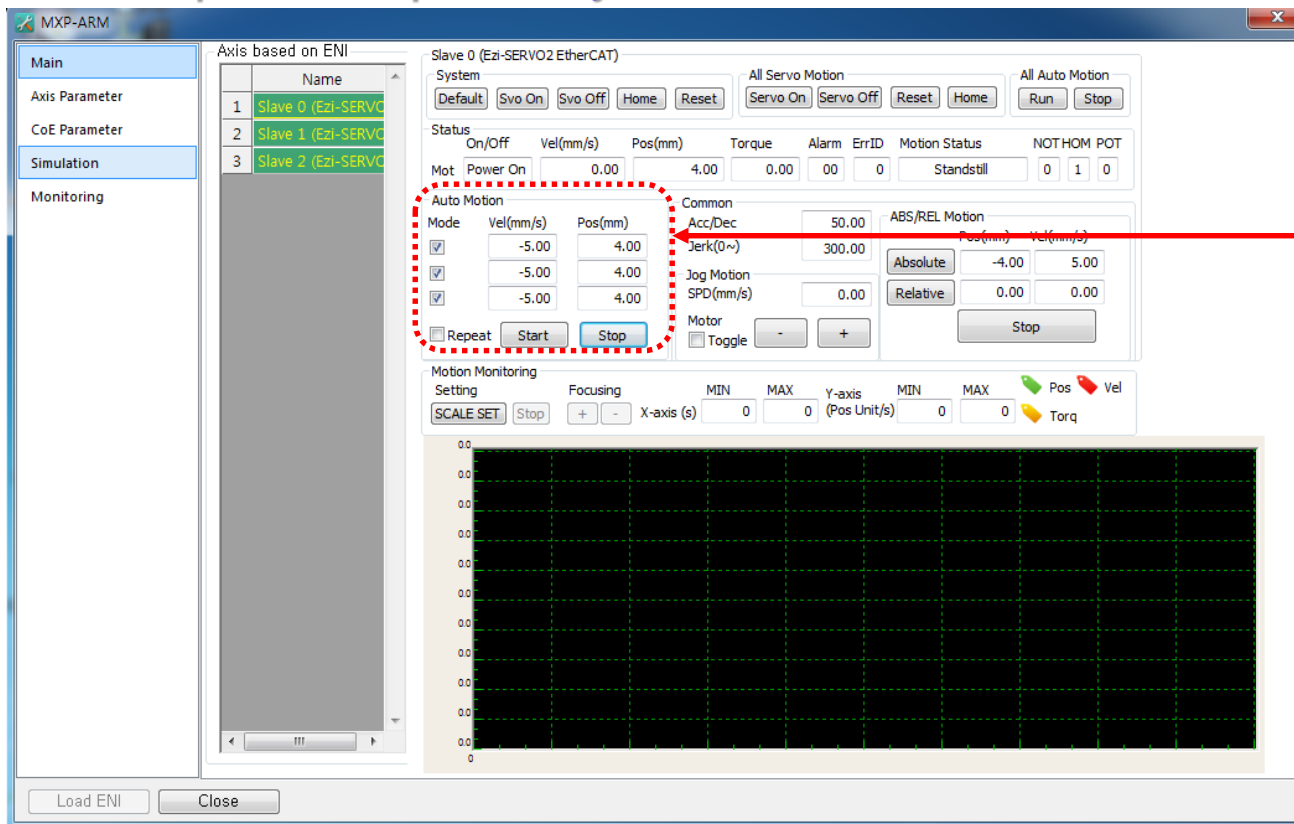
Position & Velocity graph can be checked

3. Simulation [Multi-axes movement]

Confidential

❑ Multi-axes CSP operation (Vel, Pos value input after checking each mode)

**** Repeat Test is possible by Auto Motion**



**Auto Motion :
Multi-axes Repeat
motion execution
(CSP setting)**

4. Monitoring

Confidential

□ Alarm history checking by Monitoring

**** Auto save function when Alarm generating**

The screenshot displays the MXP-ARM software interface. On the left, a navigation menu includes 'Main', 'Axis Parameter', 'CoE Parameter', 'Simulation', and 'Monitoring', with 'Monitoring' highlighted. The main window is divided into three sections: 'Status', 'EtherCAT Status', and 'Alarm History'. The 'Status' section contains a table with columns for Item, Main, Motion, Scheduler, Modbus, and EtherCAT / IO. The 'EtherCAT Status' section contains a table with columns for Devices, State, Port 3, Port 2, Port 1, and Port 0. The 'Alarm History' section contains a table with columns for Item, Description, and Error Code. A red dashed box highlights the 'Monitoring' menu item and the 'Status' table. A red arrow points from the text 'Real-time motion & EtherCAT I / O information changes can be checked.' to the 'Status' table.

Item	Main	Motion	Scheduler	Modbus	EtherCAT / IO
1 Heartbeat	2874	2871	2871	2874	2870
2 Creation	Created	Created	Created	Created	Created
3 Setting time [ms]	-	4.000000	1.000000	-	4.000000 / 4.000000
4 Current time [ms]	-	3.957561	1.006251	-	4.069963 / 4.054813
5 Minimum time [ms]	-	2.035470	0.002444	-	0.807835 / 2.905371
6 Maximum time [ms]	-	6.001339	1.489583	-	8.129664 / 5.016592
7 Current operation time [ms]	-	0.006353	0.002000	-	0.001466 / 0.140259
8 Max operation time [ms]	-	0.122440	0.224000	-	0.122000 / 2.003126

Devices	State	Port 3	Port 2	Port 1	Port 0
1 System	Run	4468 / 2180	Chk HB = 3769	DC+ = 5	DC- = 11
2 Master (EtherCAT)	OP	DCF = 0	DC Pos = 0.000000	DC itr = 0.000000	Verbose = 0
3 Slave 0 (Ezi-SERVO2 EtherCAT)	OP	No link, Close	No link, Close	Link, Open	Link, Open
4 Slave 1 (Ezi-SERVO2 EtherCAT)	OP	No link, Close	No link, Close	Link, Open	Link, Open
5 Slave 2 (Ezi-SERVO2 EtherCAT)	OP	No link, Close	No link, Close	No link, Close	Link, Open

Item	Description	Error Code
13 Alarm History [13:20]	-	0
14 Alarm History [14:20]	-	0
15 Alarm History [15:20]	-	0

Real-time motion & EtherCAT I / O information changes can be checked.

**We are a pioneer changing
the history of step motor !!**



Ezi-SERVO[®]
Closed Loop Stepping System