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LIVE – I.C.E._L7N

Professional Version 1.1 **User Manual 1.1**

Notes for Safety

- Be sure to read the notes for safety to use correctly before use.
- After reading User Manual, keep it in a place where the users never fail to see it.

LS Mecapion

Table of Contents

List of Figures

List of Tables

1. Descriptions on the Manual

1.1 Functions and Objectives of 'LIVE - I.C.E. Manual'

'LIVE - I.C.E. Manual' describes the installation guide, functions and technical support for 'LIVE – I.C.E.', a dedicated PC software program for APD-L7N Servo Drive.

'LIVE - I.C.E. Manual' will not describe APD-L7N Servo Drive except for necessary cases to understand the functions. For information on APD-L7N Servo Drive, refer to APD-L7N Servo Drive Manual.

1.2 Descriptions of Marks in 'LIVE - I.C.E. Manual'

'LIVE - I.C.E. Manual' uses the following mark system.

⚠ Caution
If there is a risk of malfunction of the computer or Servo Drive due to misuse, it is marked as "Caution" and explanation is provided about it.

1.3 Composition of 'LIVE - I.C.E. Manual'

'LIVE - I.C.E. Manual' is composed of 6 chapters.

The brief introductions of the chapters are as follows.

- Chapter 1: Describes the purposes and composition of the manual.
- Chapter 2: Describes the operation environment and installation of 'LIVE - I.C.E.'.
- Chapter 3: Describes the composition of 'LIVE - I.C.E.'
- Chapter 4: Describes the functions of 'LIVE - I.C.E.'
- Chapter 5: Describes the technical support of 'LIVE - I.C.E.'

2. Installation of 'LIVE - I.C.E.'

'LIVE - I.C.E.' provides the installation files and the dedicated USB device driver for APD-L7N Servo Drive to install the program in the user's PC. Since these files are required to operate 'LIVE - I.C.E.' on the user's PC, you should check if they are provided.

2.1 Installation Requirements of 'LIVE - I.C.E.'

Table 1 - Installation Requirements

Items	Recommended Specifications	Minimum Specifications
Computer OS	Microsoft Windows XP	Microsoft Windows 2000 or later
Hardware	USB port supporting USB 1.0 or later	USB port supporting USB 1.0 or later
Others		

'LIVE - I.C.E.' installation requirements are as shown in Table 1.

The OS platforms are 'Microsoft Windows 2000' or later and 'Microsoft Windows XP or older.' **If '.NET Framework' is not installed, install it before installing LIVE - I.C.E.'.**

⚠ Caution
We don't guarantee the installation and operation on any OS other than Microsoft Window 2000' and 'Microsoft Windows XP.'

2.2 Installation of 'LIVE - I.C.E.'

For the installation of 'LIVE - I.C.E.', you must install the PC application 'LIVE - I.C.E.' and dedicated USB device driver.

'LIVE - I.C.E.' is automatically installed by an installer program and the USB device driver is installed by 'Found New Hardware Wizard' **(Continue after downloading and installing the device driver setup file.)**.

2.2.1 Installation of the PC Application

To install the PC application ('LIVE - I.C.E.'), the installation files are provided. The following lists the installation files.

- Setup.msi
- vcredist_x86
- WindowsInstaller3_1

The above mentioned files are required to install the PC application and so you must check if they are provided.

You can start the installation of the PC application by double-clicking 'Setup.msi.'

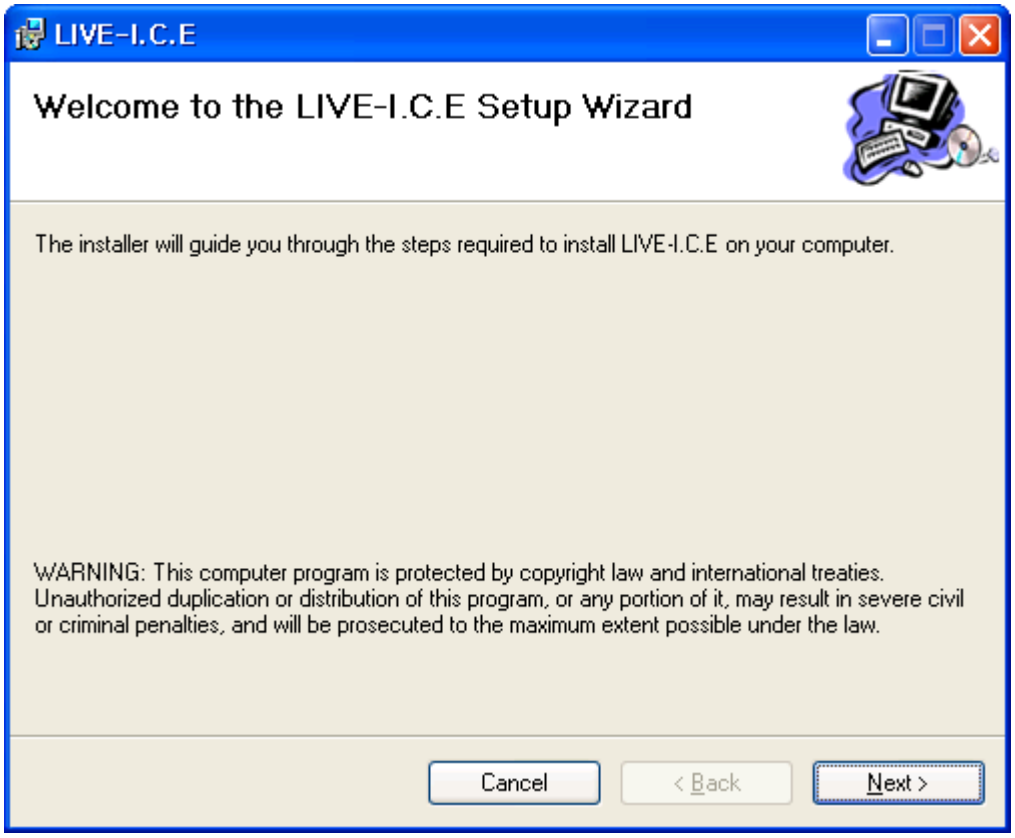
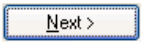


Figure 1 - Installation of PC application: Start 'LIVE - I.C.E.' Setup Wizard

In above <Figure 1>, click  to move to the next.

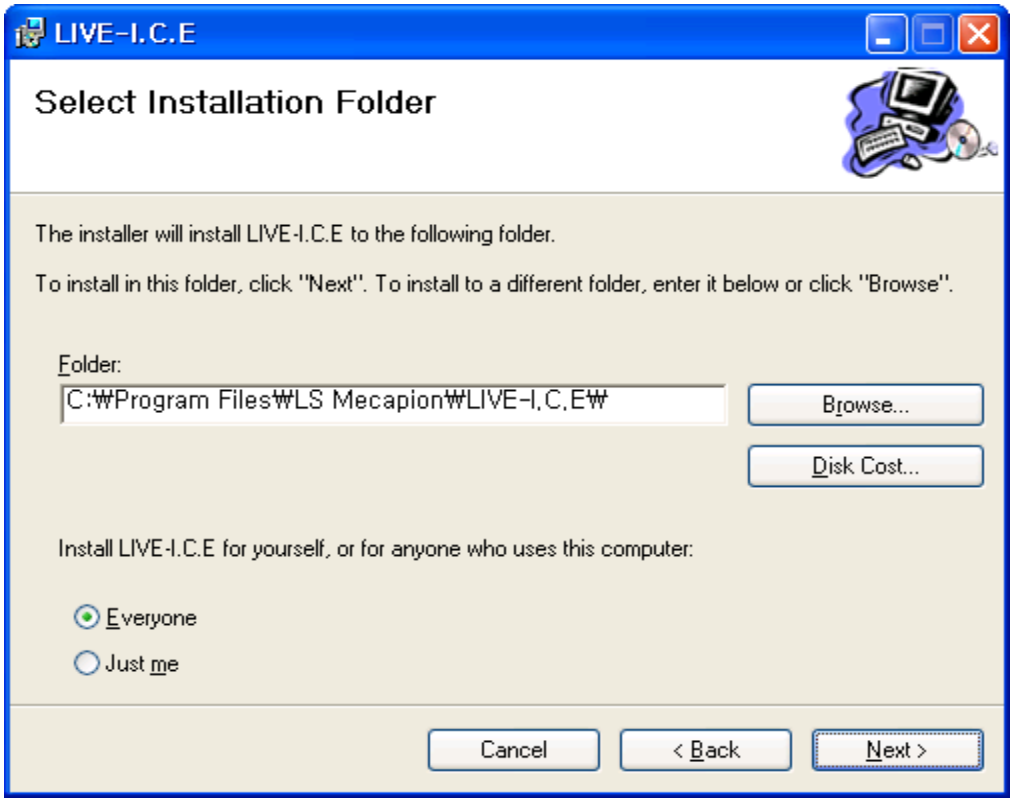


Figure 2 - Installation of PC application: Select Installation Folder

When a dialogue window appears to prompt you to select the installation folder as in <Figure 2>, set the installation folder for 'LIVE - I.C.E.' and move to the next.

⚠ Caution
▪ The default installation folder path is "C:\Program Files\LS Mecapion\LIVE-I.C.E\". ▪ If you click 'Cancel' in the <Figure 2>, the installation of 'LIVE-I.C.E.' stops. But the components installed until cancellation remain.

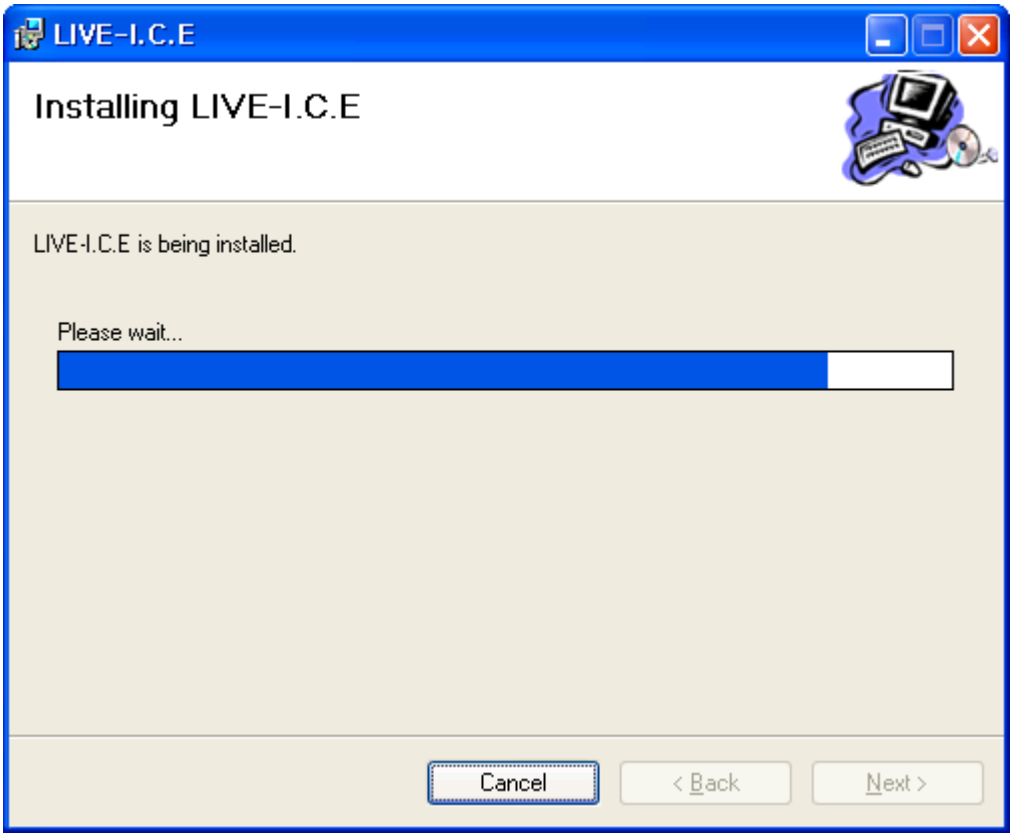


Figure 3 - Installation of PC application: Start installation

When the installation is ready and moves to the next, "'LIVE - I.C.E.' installation starts.

⚠ Caution
▪ When you click 'Cancel' button in <Figure 3>, the installation of 'LIVE-I.C.E.' stops. But the components installed until cancellation remain. ▪ The time required until the completion of installation may differ depending on the performance of the computer. ▪ If installation fails, repeat the installation from the beginning.

If the installation completes, the installation completion window appears as shown in the <Figure 4>.

Now you can find 'LIVE - I.C.E.' icon on the desktop screen.

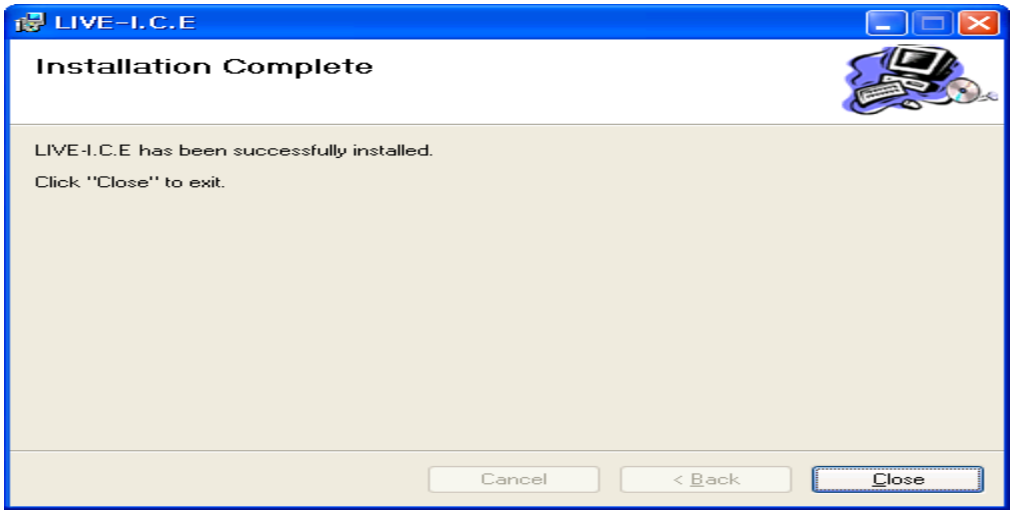


Figure 4 - Installation of PC application: Installation complete

When you click the 'LIVE - I.C.E.' icon on the desktop screen, 'LIVE - I.C.E.' runs as shown in <Figure 5>.

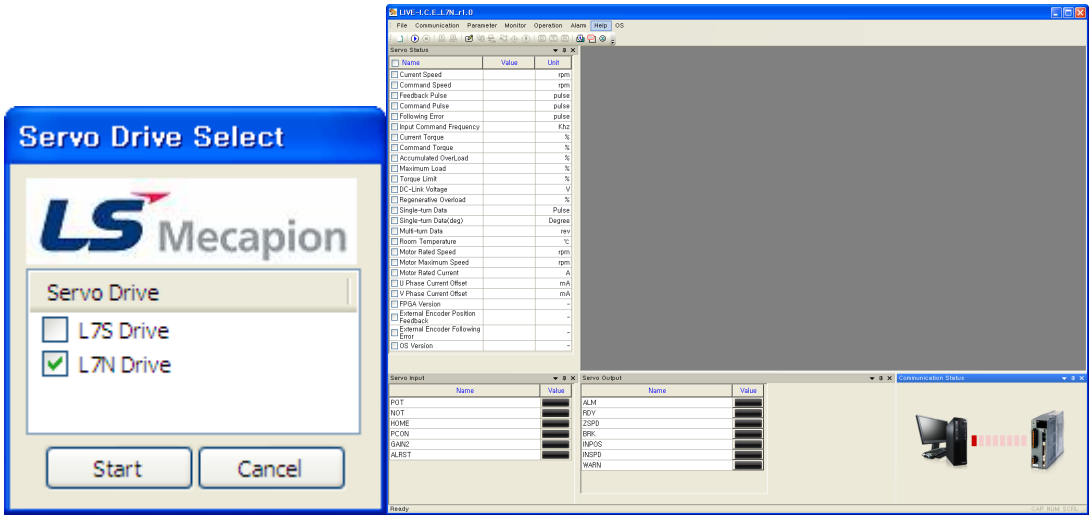


Figure 5 - Installation of PC application: Run

If 'LIVE - I.C.E.' runs normally as shown in <Figure 5>, the installation is successful.

2.2.2 Installation of USB Device Driver

For the USB communication between APD-L7N Servo Drive and the computer, USB device driver should be installed on the computer.

'LIVE - I.C.E.' provides the following file for the installation of the device driver.

- PL2303_Prolific_DriverInstaller_v1417.exe

The above file is provided in the folder named 'PL2303_Prolific_DriverInstaller_v1417'.

The above mentioned file is required for 'LIVE - I.C.E.' to make USB communication with the PC and therefore you must check if it is provided.

Run PL2303_Prolific_DriverInstaller_v1417.exe file to start installation before connecting the USB with the PC.

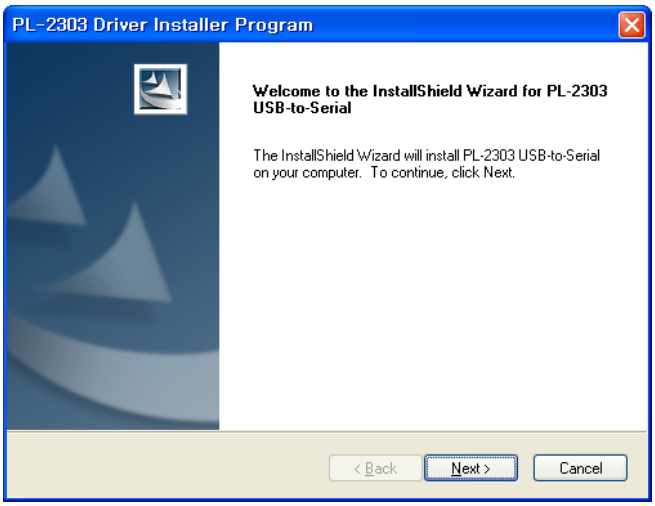


Figure 6 - Installation of USB device driver: Start InstallShield Wizard for PL-2303

In above <Figure 6>, click Next > button to move to the next.

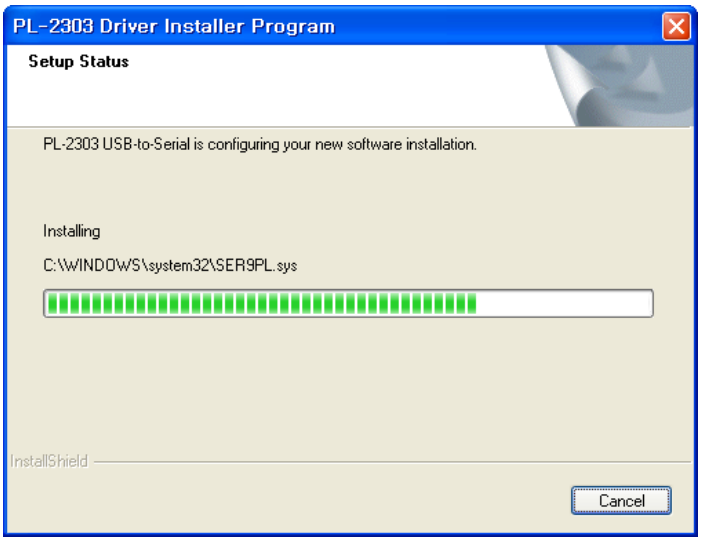


Figure 7 - Installation of USB device driver: Install PL-2303 components

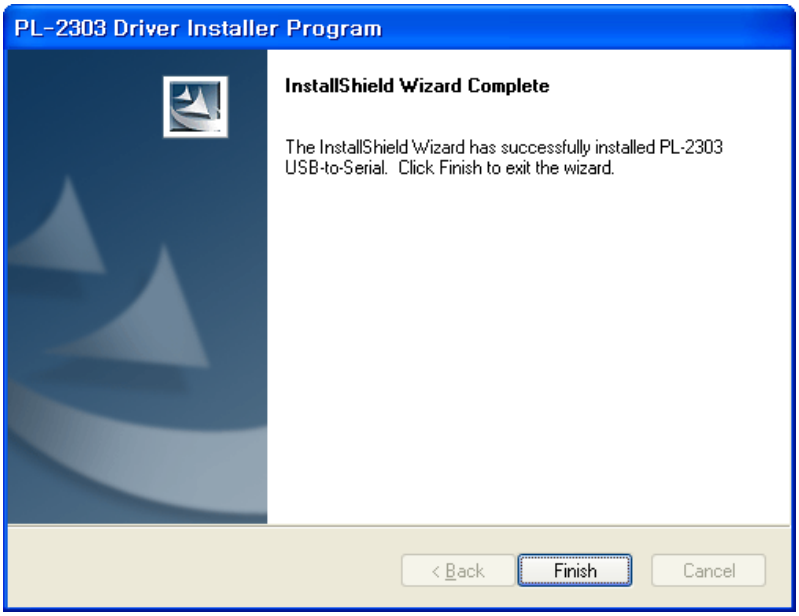


Figure 8 - Installation of USB device driver: Finish PL-2303 components installation

APD-L7N Servo Drive USB starts the installation of the device driver when it is connected with the computer, as other peripherals do.

Figure 9 - Installation of USB device driver: Connect the cable

As shown in <Figure 9>, power on APD-L7N Servo Drive and, when the boot is complete, connect the USB cable with the PC.

⚠ Caution
When you connect the USB cable for the first time to install the USB device driver, you must do it after APD-L7N Servo Drive has completed the booting.

When APD-L7N Servo Drive's USB device driver is installed, you can find it in the 'Device Manager'.

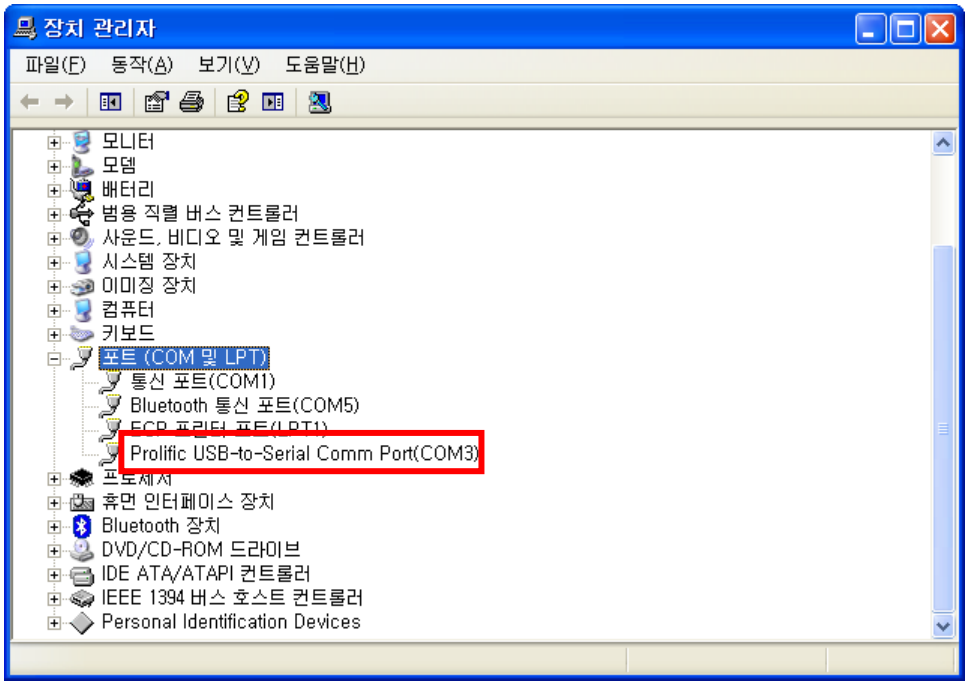


Figure 10 - Installation of USB device driver: Check the installation

⚠ Caution
Since the device driver is a USB to Serial type, you should check if it is displayed as a serial port.

3. Composition of 'LIVE - I.C.E.'

'LIVE - I.C.E.', the PC program for APD-L7N Servo Drive, supports the following functions: Servo Drive monitoring, parameter setting, graphing (Trigger Monitor, Alarm Trace and Data Trace), alarm history, auto gain tuning and JOG operation.

3.1 Composition for USB Monitoring Function

3.1.1 Main dialogue window

The following <Figure 11> is the main dialogue window for 'LIVE - I.C.E.'.

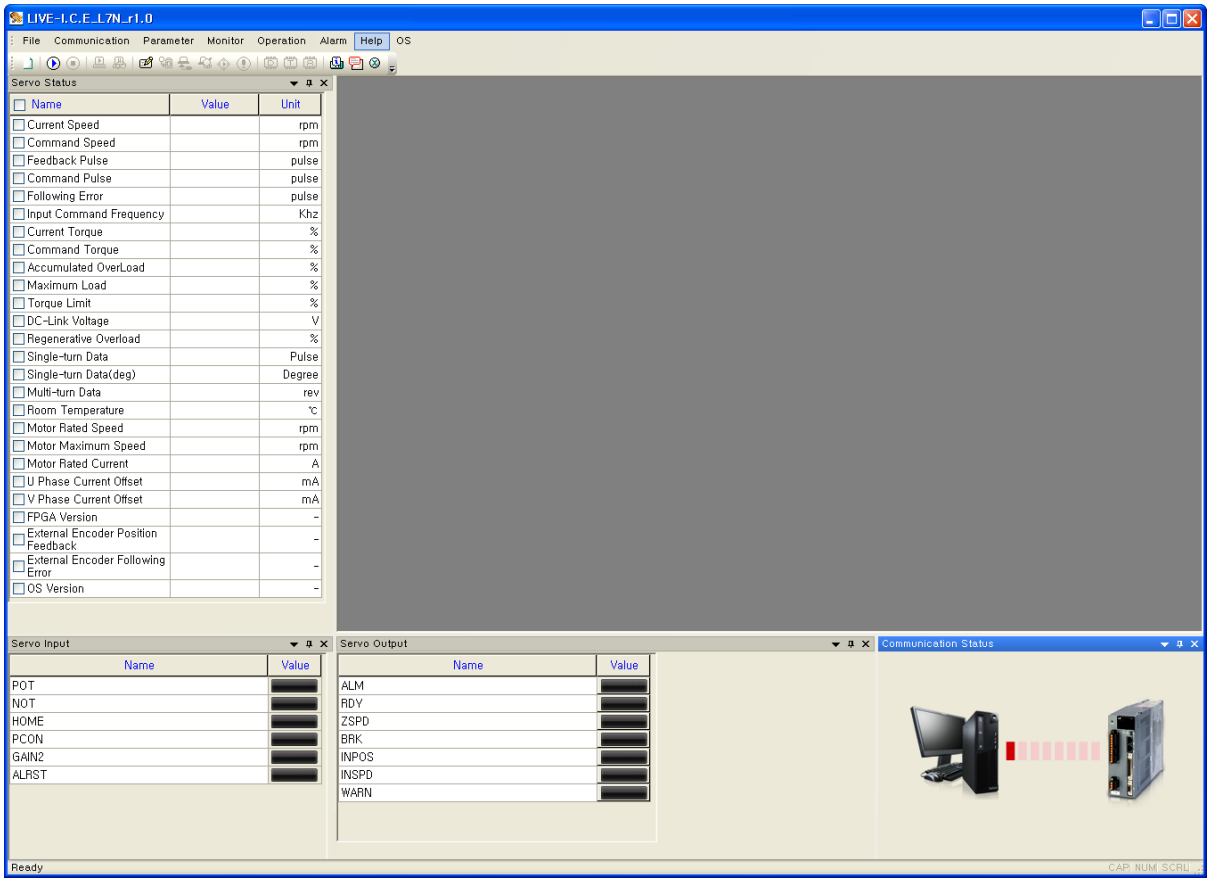


Figure 11 - 'LIVE - I.C.E.': Main dialogue window

Figure 12 - 'LIVE - I.C.E.': Main menu bar and icon bar

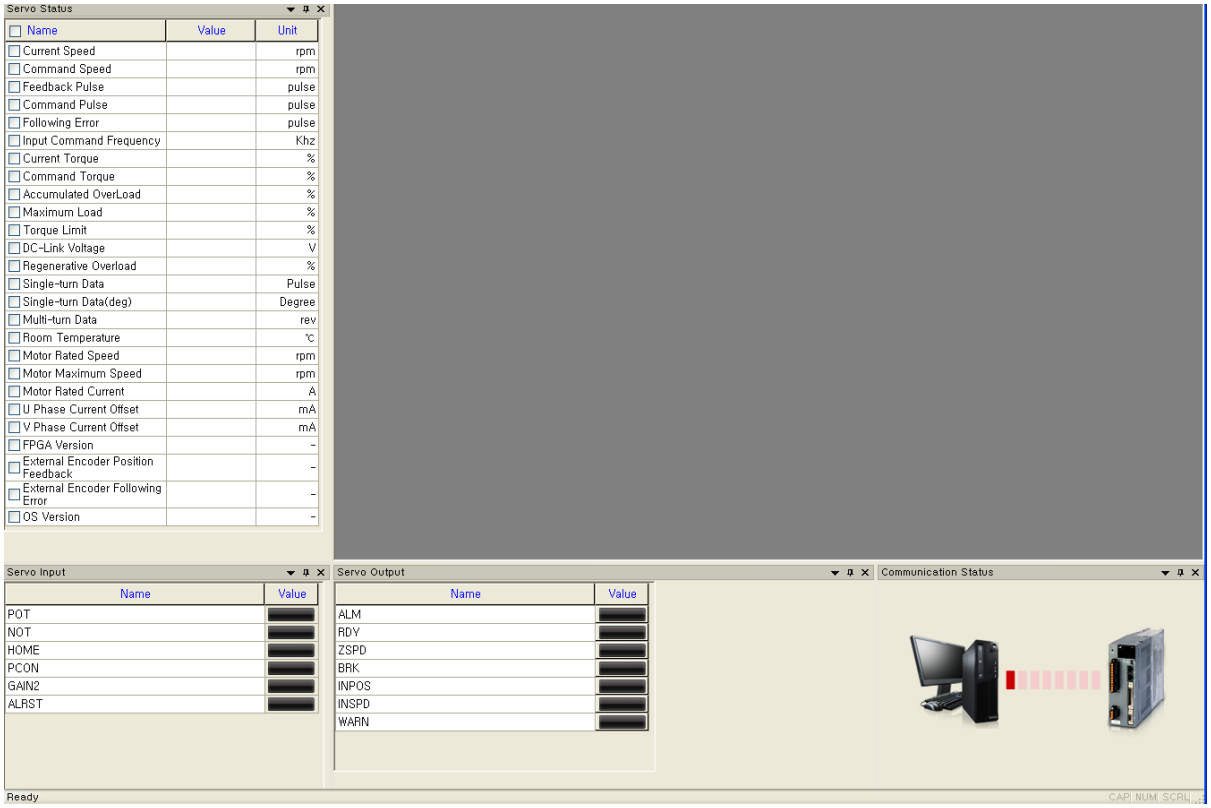


Figure 13 - 'LIVE - I.C.E.': Status Bar

The descriptions of each part of the main dialogue window are as shown in <Table 2>.

Table 2 - Descriptions of each part of the main dialogue window

Figure	Name	Details
11	Main menu bar	**1.** File : **a.** New => Reactivate the Servo selection window **b.** Exit LIVE-I.C.E. => Close the monitoring program **2.** Communication : **a.** Communication Setting => Set up the communication settings **b.** Connect => Make the communication connection **c.** Disconnect => Close the communication connection **3.** Parameter : **a.** Parameter Editing => Read/write the parameters **4.** Monitor : **a.** Trigger Monitoring => Graph the Trigger **b.** Cyclic Monitoring • Start => Start the real-time monitoring • Stop => Stop the real-time monitoring • Data Trace => Graph the real-time monitoring **5.** Operation **a.** Manual Test Operation => Operate the manual JOG **b.** Gain Auto Tuning => Tune the gain automatically **c.** Program Jog Operation

Figure	Name	Details
		=> Operate the automatical JOG **6.** Alarm **a.** Alarm Trace => Graph the alarm history trace **b.** Alarm History => Read/erase the alarm history **c.** Alarm Reset=> Reset the alarm **7.** Help **a.** User Manual => User's manual **b.** About LIVE-I.C.E.=> Version information **8.** OS **a.** OS Downloader=> Provide the firmware downloader program
17	Status Bar	**1.** Servo Status Bar **a.** Check the pre-defined parameters in real time • Runs when the real-time monitoring is selected • Selectable individually **2.** Servo Input Bar **a.** Check the digital input contact against the initially set contact **3.** Servo Output Bar **a.** Check the digital output contact point against the initially set contact point **4.** Communication Status Bar **a.** Check the communication connection status

3.1.2 Communication Dialogue Window

The following <Figure 14> shows the Communication dialogue window which supports the communication connection function of APD-L7N Servo Drive.

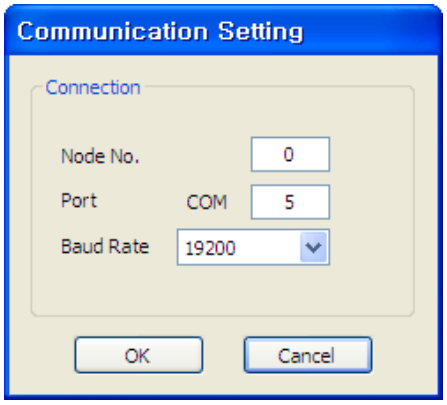


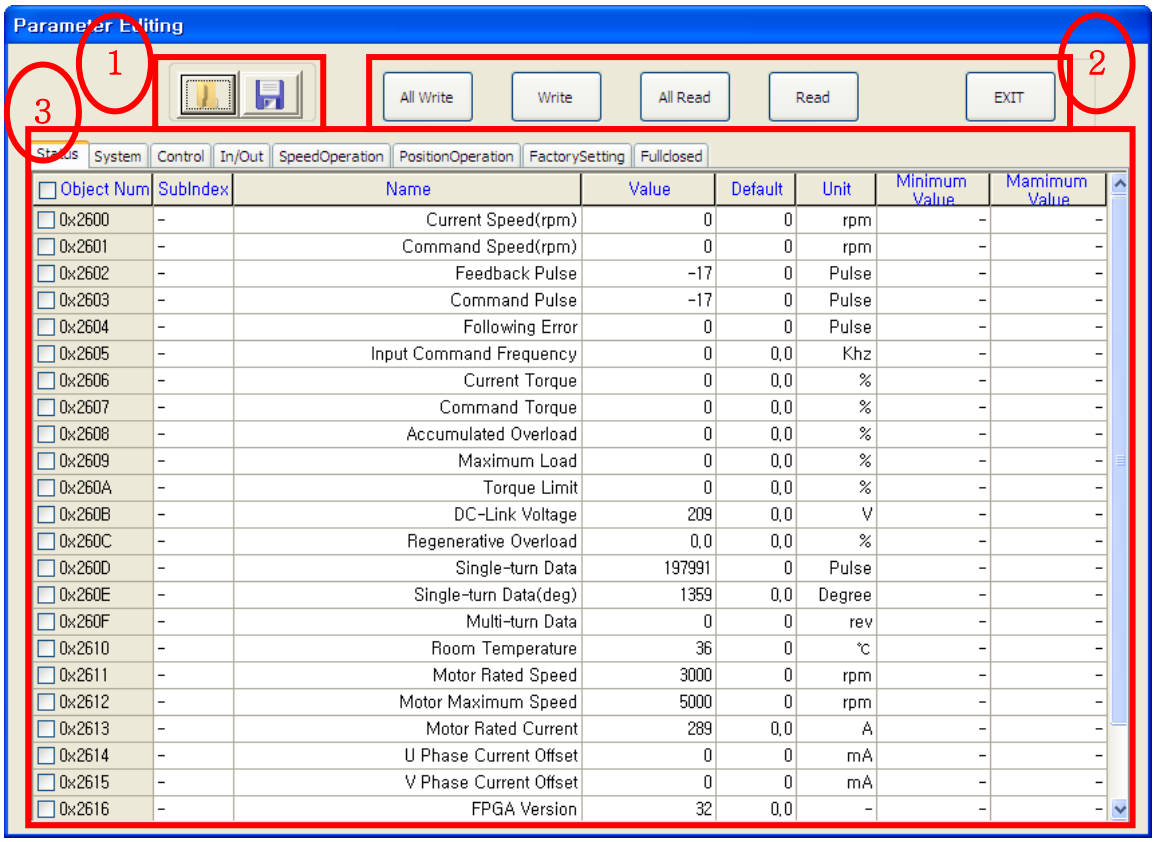
Figure 14 - 'Communication Setting' dialogue window

** In the case of Communication connection Error, Please Check the following.

- Check the connection of the USB to Serial Device from the Control Panel.
- Baud rate is fixed at the 19200

3.1.3 'Parameter Editing' Dialogue Window

The composition and details of the dialogue window for 'LIVE - I.C.E.' Parameter Upload/Download function are as follows.



Object Num	SubIndex	Name	Value	Default	Unit	Minimum Value	Mamimum Value
0x2600	-	Current Speed(rpm)	0	0	rpm	-	-
0x2601	-	Command Speed(rpm)	0	0	rpm	-	-
0x2602	-	Feedback Pulse	-17	0	Pulse	-	-
0x2603	-	Command Pulse	-17	0	Pulse	-	-
0x2604	-	Following Error	0	0	Pulse	-	-
0x2605	-	Input Command Frequency	0	0,0	Khz	-	-
0x2606	-	Current Torque	0	0,0	%	-	-
0x2607	-	Command Torque	0	0,0	%	-	-
0x2608	-	Accumulated Overload	0	0,0	%	-	-
0x2609	-	Maximum Load	0	0,0	%	-	-
0x260A	-	Torque Limit	0	0,0	%	-	-
0x260B	-	DC-Link Voltage	209	0,0	V	-	-
0x260C	-	Regenerative Overload	0,0	0,0	%	-	-
0x260D	-	Single-turn Data	197991	0	Pulse	-	-
0x260E	-	Single-turn Data(deg)	1359	0,0	Degree	-	-
0x260F	-	Multi-turn Data	0	0	rev	-	-
0x2610	-	Room Temperature	36	0	℃	-	-
0x2611	-	Motor Rated Speed	3000	0	rpm	-	-
0x2612	-	Motor Maximum Speed	5000	0	rpm	-	-
0x2613	-	Motor Rated Current	289	0,0	A	-	-
0x2614	-	U Phase Current Offset	0	0	mA	-	-
0x2615	-	V Phase Current Offset	0	0	mA	-	-
0x2616	-	FPGA Version	32	0,0	-	-	-

Figure 15 - 'Parameter Editing' dialogue window

Table 3 - Composition and details of Parameter Editing

Number	Name	Details
①	File Save /Read	: Parameter Data File Read : Parameter Data File Save
②	Main Function Select Buttons	All Write: Parameter All Write Write: Parameter Write All Read: Parameter All Read Read: Parameter Read

Number	Name	Details
		EXIT : Exit Parameter Editing window
③	Parameter Data Display TAB	TAB that displays Parameter St - P4 data

3.1.4 Graph Setting Dialogue Window

The following <Figure 16> is a dialogue window that supports the control of the Y-axis scale.

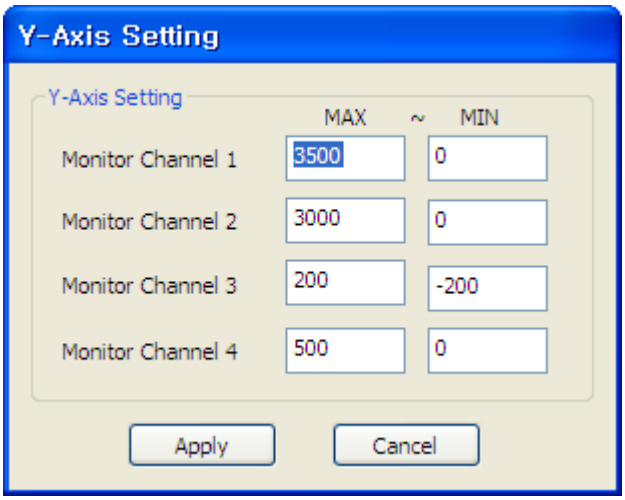


Figure 16 - Graph setting dialogue window

3.1.5 Graph Dialogue Window

The following <Figure 17> is a dialogue that supports the activation of graph according to the output data conditions.

There are three types of graphs: Trigger Monitoring, Data Trace and Alarm Trace, but the dialogue windows are all similar and so the Trigger Monitoring dialogue window will be used for description.

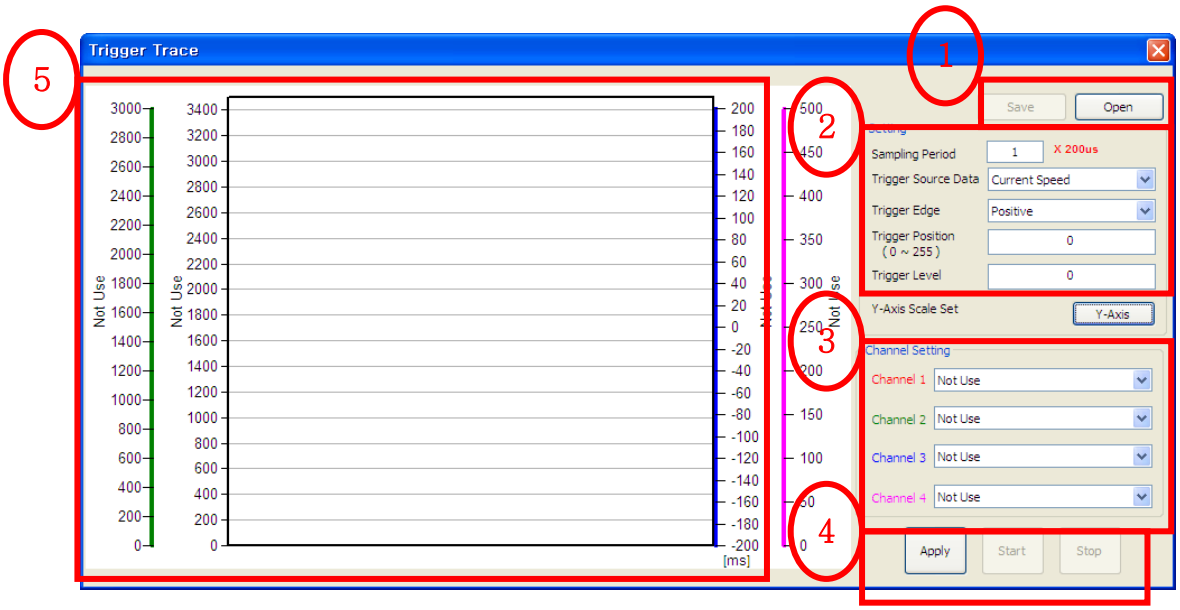


Figure 17 - Graph dialogue window

Table 4 - Composition and details of Parameter Editing

Number	Name	Details
①	File Save /Read	Save: Graph Data File Save Open: Parameter data file Read
②	Initial setting	**1.** Trigger Monitor: • Set Sampling Period, Trigger Source, Trigger Edge, Trigger Position and Trigger Level. **2.** Data Trace and Alarm Trace • Set up Sampling Period
③	Channel setting	Set the pre-defined channel list.
④	Command Function Select Buttons	Apply: Apply the initial settings to the Drive Start: Start the graph output for the defined values Stop: Stop the graph output
⑤	Display the graph data	Display the graph data on the screen

3.1.6 Manual JOG Dialogue Window

The following <Figure 18> is a dialogue window that supports the manual JOG operation.

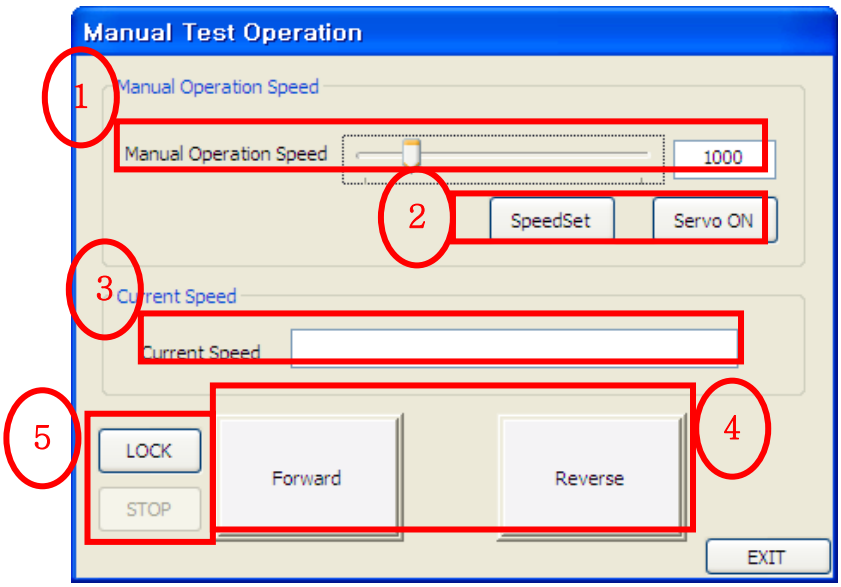


Figure 18 - Manual JOG dialogue window

Table 5 - Composition and details of Manual JOG

Number	Name	Details
①	JOG operation speed	Change and display the speed when operating the manual JOG
②	Command Function Select Buttons	SpeedSet: Apply the changed JOG operation speed Servo ON: Switch on/off SVON contact manually
③	Current speed	Display the current speed when operating JOG manually
④	Command Function Select Buttons	Forward: Move in forward direction Reverse: Move in reverse direction
⑤	Direction Buttons Lock/Unlock	LOCK / STOP : state of Unlock. UNLOCK / STOP : state of Lock(STOP is activated)

3.1.7 Auto Gain Tuning Dialogue Window

The following <Figure 19> is a dialogue window that supports the automatic gain tuning function.

Tuning Speed: 1 (in 100RPM)

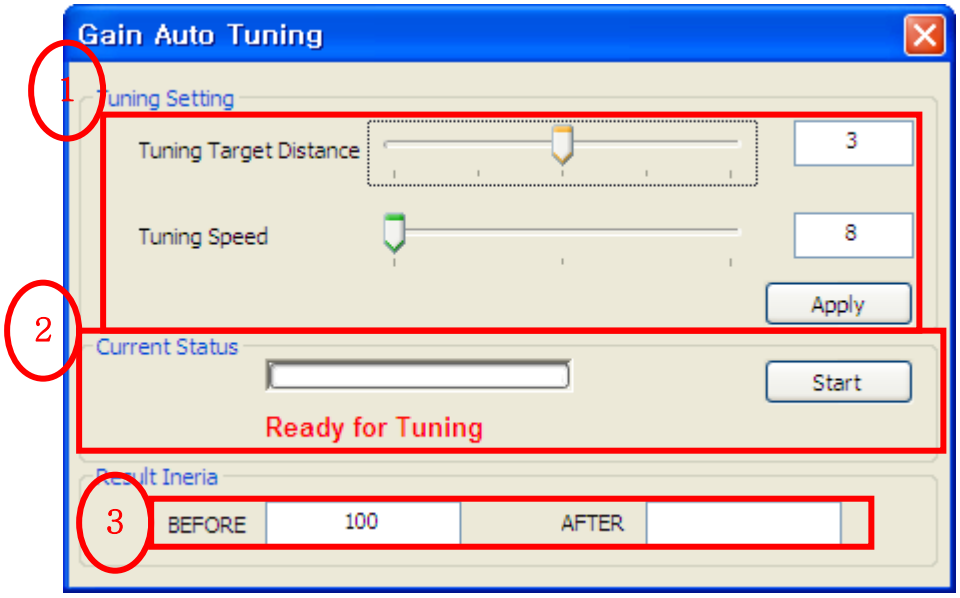


Figure 19 - Auto gain tuning dialogue window

Table 6 - Composition and details of Auto Gain Tuning

Number	Name	Details
①	Initial setting	**1.** Initial settings before tuning • Set the target distance and speed Apply: Apply the changed initial settings
②	Current status	Display that Auto gain tuning is on. Start: Start tuning
③	Estimated inertia ratio	Display the estimated inertia ratios before and after tuning

3.1.8 Alarm History Dialogue Window

The following <Figure 20> is a dialogue window that supports the alarm history data.

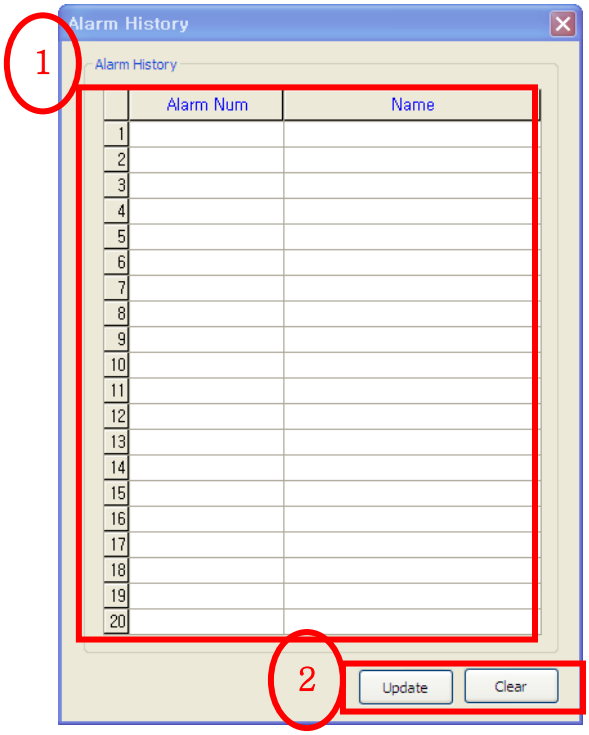


Figure 20 - Alarm history dialogue window

Table 7 - Composition and details of Alarm History

Number	Name	Details
①	Alarm data	Display the alarm data saved in the Drive
②	Command Function Select Buttons	Update: Read the alarm data Clear: Delete the saved alarm data

4. Functions of 'LIVE - I.C.E.'

'LIVE - I.C.E.' is a PC application that uses USB connection to communicate with APD-L7N Servo Drive. It uses the functions in <Table 8> to monitor the status of APD-L7N Servo Drive and set the parameters required for running.

Table 8 – 'LIVE - I.C.E.' functions list

Category	Function	Details
Monitoring function	I/O input contact monitoring	Monitor and display the on/off of the contacts of Servo On, Speed1, Speed2, Speed3, Alarm Reset, Direction, CCW Limit, CW Limit, Emergency, Stop, Electric Gear1, Electric Gear2, P Control, Gain2, Pulse Clear, Torque Limit, Mode, ABS Encoder Call and Zero Clamp.
	I/O output contact monitoring	Monitor and display the on/off of the contacts of Alarm, Ready, Zero Speed, Brake, In Position, Torque Limit, Velocity Limit, In Speed and Warning.
	Driving Information monitoring	Monitor and display the values of parameters St-01 to St-17 and St-25 to St-26
	Communication connection monitoring	Display the current communication connection status as an animation in real time
Setting Function	Parameter setting	Read and write the parameters St-00 to P4-14
	Manual JOG function	Manual JOG speed change and forward/reverse direction test
	Program JOG function	Automatical JOG function by the Parameter setting
	Auto Gain Tuning function	Set the Drive's gain automatically
	Alarm History function	Display the latest 20 alarms
	Alarm reset function	Reset the alarm when the alarm is issued
Graph Function	Data Trace function	Display the graph for the pre-defined channel in real time
	Trigger Monitoring function	Display the graph according to the pre-defined channel and Trigger settings
	Alarm Trace function	Display the alarm history graph for the pre-defined channel
Download Program	OS Download function	Provide the firmware version upgrader program

4.1 USB connection and communication connection

Connect the USB cable to the computer right after you power on APD-L7N Servo Drive.

4.1.1 Make the USB connection after APD-L7N Servo Drive is booted.

In general 'LIVE - I.C.E.' is used to connect the monitoring function, setup function and graph function of APD-L7N Servo Drive.

Connect in the following sequence.

1. Power on APD-L7N Servo Drive. Check if APD-L7N Servo Drive initialization is completed and a message appears in FND. (Be sure to turn on the control power)
2. Use the USB cable between the user's computer and APD-L7N Servo Drive. At this time, the user's computer must be powered on and the booting completed.

The USB connection by the above sequence can be made whatever status APD-L7N Servo Drive is in. For instance, you can make the USB connection even when APD-L7N Servo Drive is running or when an alarm is issued. In addition, the USB connection doesn't stop, or temporarily stop, the work APD-L7N Servo Drive is doing and the continuity of the previous works is ensured.

If the USB device driver is not installed on the user's computer, a dialogue window appears to install the USB device driver as in '2.2.2 Installation of USB Device Driver'.

⚠ Caution
To install the USB device driver, it is recommended to use the method that follows above mentioned sequence.

4.1.2 Communication connection and termination after USB connection

In order to use the settings and functions of 'LIVE – I.C.E.', the connection with APD-L7N Servo Drive' must be established.

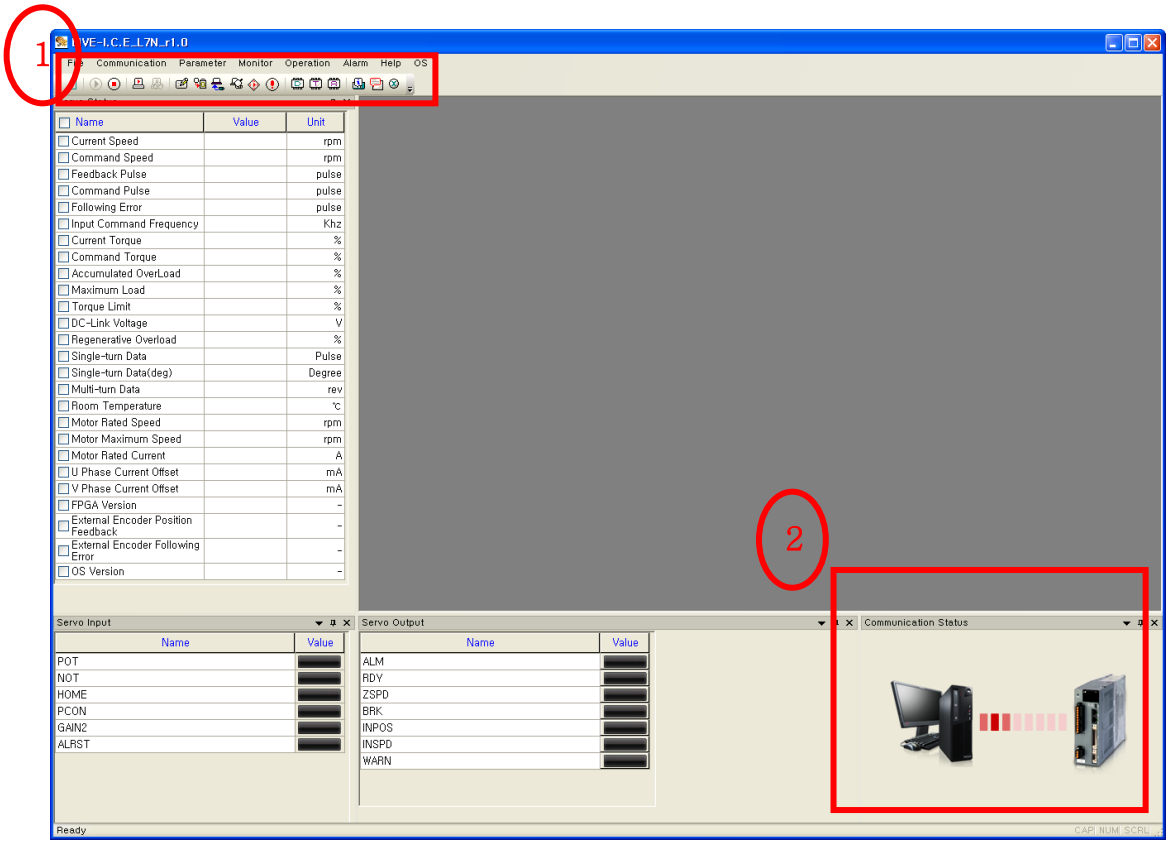


Figure 21 - Communication connection

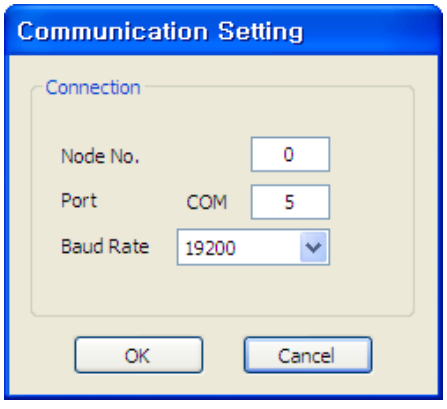


Figure 22 - Communication setting

1. In ① of the above <Figure 21>, if you select Communication -> Communication Setting or click icon, a dialogue window as shown in the above <Figure 22> appears with icon activated.
2. As shown in <Figure 22>, set Comm (select the cable), Node No., Port and Baud Rate, and click OK button.

3. In ① of the above <Figure 21>, if you select Communication -> Connect or click icon, the Communication Status animation of ② in the above <Figure 21> is activated.

4. When you exit, in ① of the above <Figure 21>, if you select Communication -> Disconnect or click icon, the communication connection is closed and the Communication Status animation of ② is inactivated.

⚠ Caution
The Communication Status of ② in <Figure 21> shows the computer communication status and is not related with the Drive connection status. An alarm window appears if you try to communicate with the Drive, when it is not connected.

4.2 Monitoring function

'LIVE - I.C.E.' based monitoring collects, through USB communication, and displays important values that show the current status of APD-L7N Servo Drive.

4.2.1 Monitoring Start and Termination

The method to use the USB communication to monitor the APD-L7N Servo Drive information from 'LIVE - I.C.E.' is as follows.

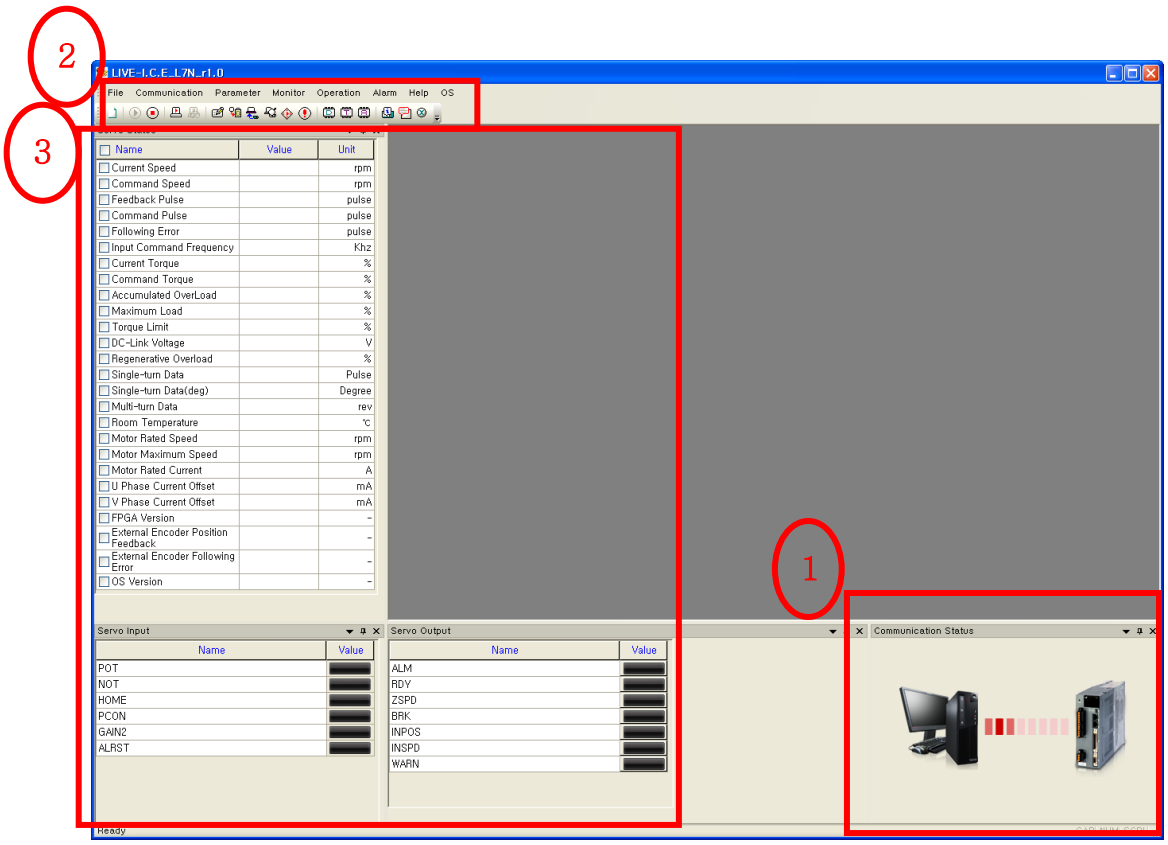


Figure 23 - Communication start

1. As in ① in the above <Figure 23>, check first if the USB connection is established and if this is recognized by 'LIVE - I.C.E.'.

2. In ② of the above <Figure 23>, select Monitor -> Cyclic Monitoring -> start, or click icon.

3. As in ③ of the above <Figure 23>, you are supposed to check the parameters selected in the CheckBox. For the I/O contact status, [redacted] is off, while [redacted] is on.

As soon as the monitoring starts according to the above sequence, values showing the Servo Drive status come from APD-L7N Servo Drive and they are displayed on the screen.

When the monitoring starts, 'LIVE - I.C.E.' operates as in the following <Figure 24>.

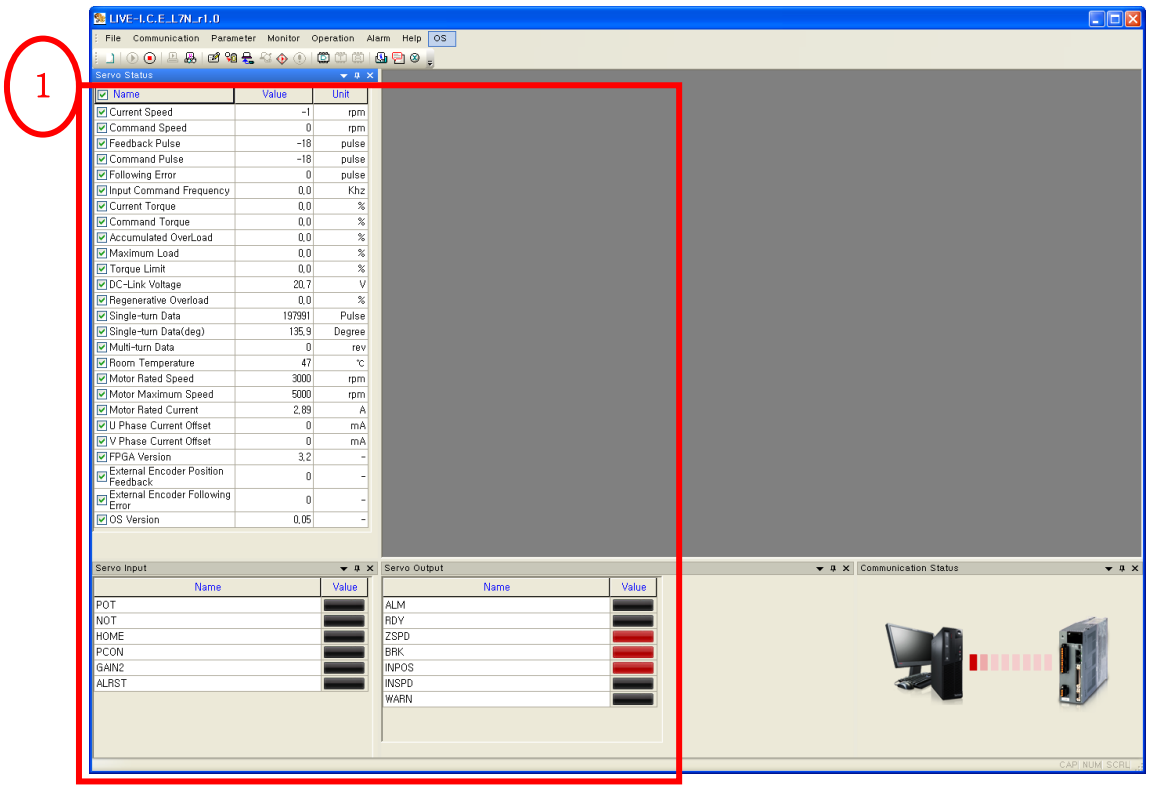


Figure 24 - In monitoring

The description on the above <Figure 24> is as follows.

1. When the monitoring begins as in ①, the functions of **'Auto Gain Tuning', 'Alarm History', 'Trigger Monitoring' and 'Alarm Trace'** become inactive.
2. The on/off status of the I/O contact is displayed.
3. As in ①, values are displayed for the parameters selected in the CheckBox.

4.2.2 Monitoring Data

The values monitored through the USB communication are as shown in <Table 9>.

Table 9 - Monitored values list

Category	Details
The on/off status of the I/O contact	Monitor and display the on/off of the input contacts of POT, NOT, HOME, PCON, GAIN2, ALRST. Monitor and display the on/off of the output contacts of Alarm, Ready, Zero Speed, Brake, In Position, In Speed and Warning.
Drive Information	Monitor and display the values of parameters 0x2600 ~ 0x2618
Current operation status	Check if the Communication Status animation is activated

The description of the monitoring parameter data is as follows in <Table 10>.

Table 10 - Description of monitored parameter data

Category	Name	Details
0x2600	Current speed	Displays the current operation speed.
0x2601	Command Speed	Displays the current command speed
0x2602	Feedback Pulse	Displays the accumulated value of the feedback pulse.
0x2603	Command Pulse	Displays the accumulated value of the command pulse.
0x2604	Pulse Error	Displays the pulse error that the servo has to operate.
0x2605	Input Pulse Frequency	Displays input pulse frequency.
0x2606	Current Torque	Displays the current load factor against the rated load factor.
0x2607	Command Torque	Displays the command load factor against the rated load factor.
0x2608	Accumulated Overload	Displays the currently accumulated load factor against the maximum accumulated load factor as a percentage.
0x2609	Maximum Load	Displays the instantaneous maximum load factor against the rated load factor.
0x260A	Torque Limit	Displays the torque limit value.
0x260B	DC Link Voltage	Displays the current DC link voltage of the main power.
0x260C	Regenerative Overload	Displays the regenerative overload rate.
0x260D	Single-Turn Data	Displays the single turn data of the encoder in pulses.
0x260E	Single-Turn Data (Degree)	Displays the single turn data of the encoder in degrees.
0x260F	Multi Turn Data	Displays the Multi turn data of the encoder in pulses.
0x2610	Room Temperature	Displays the value of the internal temperature sensor
0x2611	Motor Rated Speed	Displays the rated speed of currently installed motor

Category	Name	Details
0x2612	Motor Maximum Speed	Displays the Maximum speed of currently installed motor
0x2613	Motor Rated Current	Displays the rated current of currently installed Motor
0x2614	U Phase Current Offset	Displays the U Phase current Offset
0x2615	V Phase Current Offset	Displays the V Phase current Offset
0x2616	FPGA Version	Displays the Version of FPGA
0x2617	External Encoder Position Feedback	Displays the position feedback of currently installed Encoder
0x2618	External Encoder Following Error	Displays the following error of currently installed Encoder
0x100A	Software Version	Displays the version of the currently installed firmware.

The description of the I/O contact monitoring data is as shown in the following <Table 11>.

Table 11 - Description of the I/O contact data

I/O contact name	Details	
	LED activated	LED deactivated
POT	POT contact ON	POT contact OFF
NOT	NOT contact ON	NOT contact OFF
HOME	HOME contact ON	HOME contact OFF
PCON	PCON contact ON	PCON contact OFF
Gain 2	Gain 2 contact ON	Gain 2 contact OFF
ALRST	ALRST contact ON	ALRST contact OFF
ALARM	ALARM issued	No ALARM issued
Ready	Ready disabled	Ready enabled
Zero speed	Zero speed reached	Zero speed to be reached
Brake	Brake not in operation	Brake in operation
In Position	Location reached	Location to be reached
In Speed	In Speed reached	In Speed to be reached
Warning	Warning issued	No warning issued
Brake	Brake not in operation	Brake in operation
In Position	Location reached	Location to be reached
Torque Limit	Torque Limit reached	Torque Limit to be reached
Velocity Limit	Velocity limit reached	Velocity Limit to be reached
In Speed	In Speed reached	In Speed to be reached
Warning	Warning issued	No warning issued

4.2.3 Monitoring Stop

The method to use the USB connection to stop 'LIVE - I.C.E.' that is monitoring the status of APD-L7N Servo Drive is shown in the following <Figure 25>.

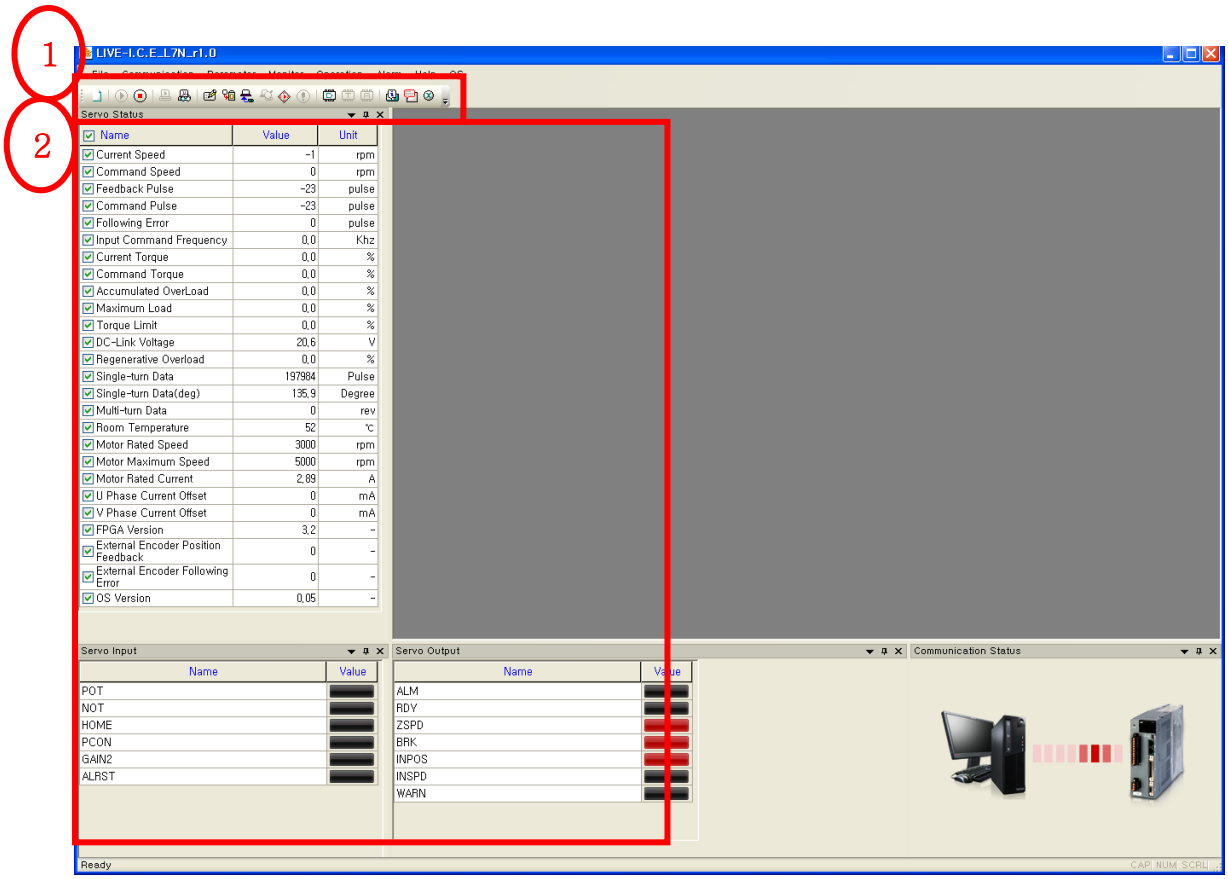


Figure 25 - Monitoring stop

1. In order to exit, in①of the above <Figure 25>, select Monitor -> Cyclic Monitoring -> Stop, or click  icon.

The description on the above <Figure 25> is as follows.

1. As shown in ②, even when the monitoring stops, the Drive Information values are kept.
2. When the monitoring stops, the functions of **'Auto Gain Tuning', 'Alarm History', 'Trigger Monitoring' and 'Alarm Trace' are activated**.

The fact that the monitoring stops doesn't mean that the USB connection between the computer and APD-L7N Servo Drive is closed. So, the Communication Status is kept.

4.2.4 A note on using the monitoring function

There is a note for using the monitoring function of 'LIVE - I.C.E.'. It is as follows.

- During the operation, the monitoring may freeze. This is due to the internal communication stabilization, not because the USB communication is closed. The communication resumes within 10 seconds. This communication stabilization does not affect the control of APD-L7N Servo Drive.

4.3 Parameter Editing

The Parameter Upload/Download function of 'LIVE - I.C.E.' reads or downloads the Parameters 0x2000 to 0x2618 of APD-L7N Servo Drive.

This function is interoperable with the real time monitoring, data trace and manual Jog functions.

* It reads all initial parameters of APD-L7N Drive when the parameter dialogue window is generated.

4.3.1 Parameter Read/Write Start

Keep in mind that the Parameter Read/Write function of 'LIVE - I.C.E.' may be limited in use when the monitoring function is in operation.

Start the Parameter Read/Write function of 'LIVE - I.C.E.' as in the following.

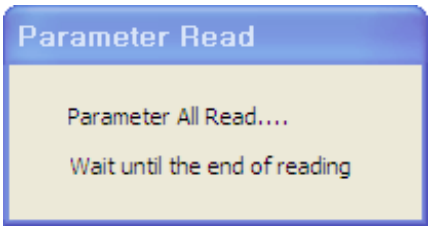


Figure 26 - Parameter Reading message

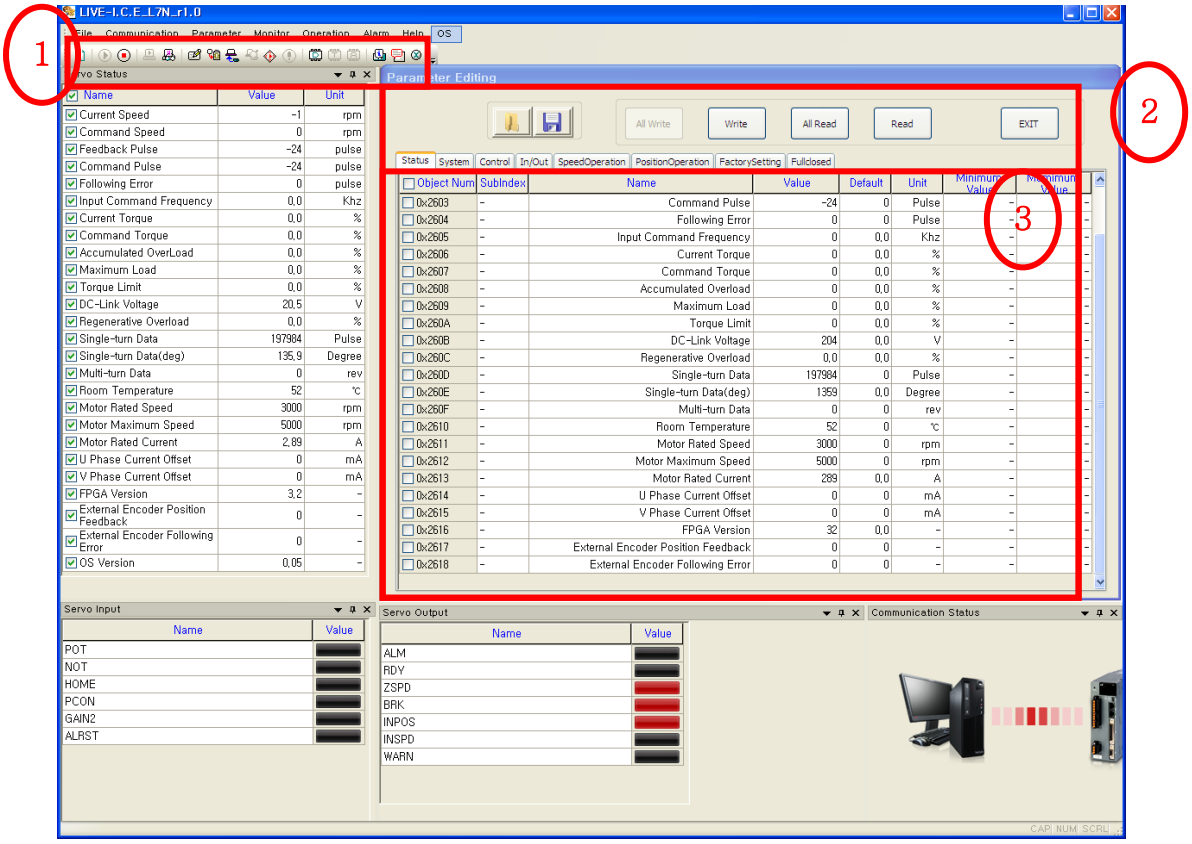


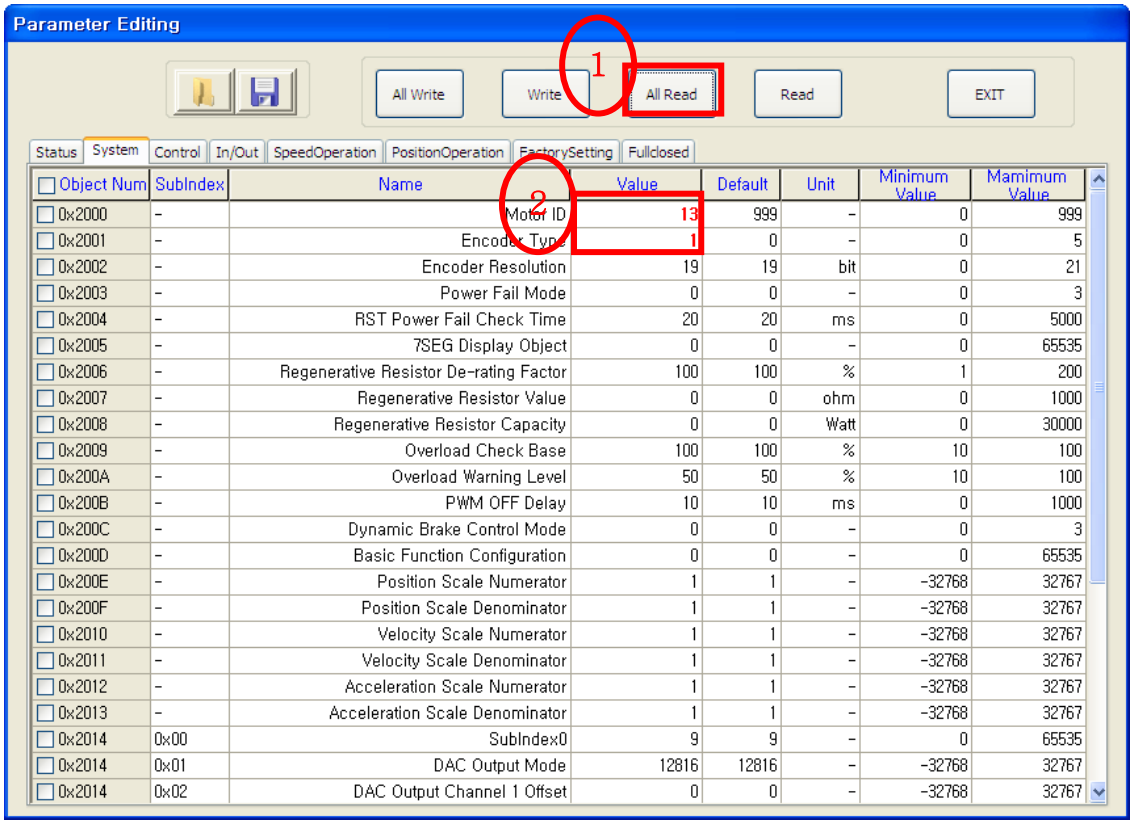
Figure 27 - 'Parameter Editing' screen

1. In ① of <Figure 27>, select Parameter -> Parameter Editing or click icon to activate Parameter Editing Dialogue as shown in ②.
2. As in ③ of the above <Figure 27>, the parameters are grouped by tab and you can use the tab to convert between the groups.
3. All parameters are read and reset when the parameter editing dialogue window is generated.

4.3.2 Read All Parameters

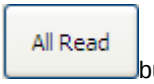
The Parameter Upload function of 'LIVE - I.C.E.' reads the parameters saved in the APD-L7N Servo Drive and reads Parameters 0x2000 to 0x2618 at a time.

The method to use the Upload All Parameters is as follows.



Object Num	SubIndex	Name	Value	Default	Unit	Minimum Value	Mamimum Value
0x2000	-	Motor ID	13	999	-	0	999
0x2001	-	Encoder Type	1	0	-	0	5
0x2002	-	Encoder Resolution	19	19	bit	0	21
0x2003	-	Power Fail Mode	0	0	-	0	3
0x2004	-	RST Power Fail Check Time	20	20	ms	0	5000
0x2005	-	7SEG Display Object	0	0	-	0	65535
0x2006	-	Regenerative Resistor De-rating Factor	100	100	%	1	200
0x2007	-	Regenerative Resistor Value	0	0	ohm	0	1000
0x2008	-	Regenerative Resistor Capacity	0	0	Watt	0	30000
0x2009	-	Overload Check Base	100	100	%	10	100
0x200A	-	Overload Warning Level	50	50	%	10	100
0x200B	-	PWM OFF Delay	10	10	ms	0	1000
0x200C	-	Dynamic Brake Control Mode	0	0	-	0	3
0x200D	-	Basic Function Configuration	0	0	-	0	65535
0x200E	-	Position Scale Numerator	1	1	-	-32768	32767
0x200F	-	Position Scale Denominator	1	1	-	-32768	32767
0x2010	-	Velocity Scale Numerator	1	1	-	-32768	32767
0x2011	-	Velocity Scale Denominator	1	1	-	-32768	32767
0x2012	-	Acceleration Scale Numerator	1	1	-	-32768	32767
0x2013	-	Acceleration Scale Denominator	1	1	-	-32768	32767
0x2014	0x00	SubIndex0	9	9	-	0	65535
0x2014	0x01	DAC Output Mode	12816	12816	-	-32768	32767
0x2014	0x02	DAC Output Channel 1 Offset	0	0	-	-32768	32767

Figure 28 –Read All Parameters

1. As ① in <Figure 28>, click  button to read all parameters instantly.

2. The data uploaded by Upload All Parameters is colored in red as in ②.
3. The color of data uploaded by Upload All Parameters is kept until the next command.

   When reading All Parameters is completed, the message box such as one in <Figure 29> appears.

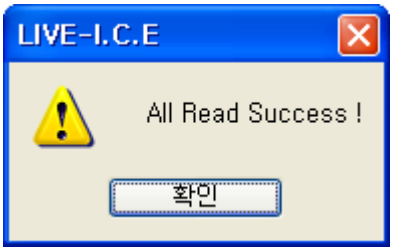


Figure 29 - Message box: Read All Parameters success

Click the 'OK' button in the message box in <Figure 29> to complete the Parameter Read.

4.3.3 Read Parameters

The Upload Parameters function of 'LIVE - I.C.E.' reads the parameters saved in APD-L7N Servo Drive for the parameters with CheckBox checked, carrying out the function based on the parameter tab classification.

The method to use the Upload Parameters is as follows.

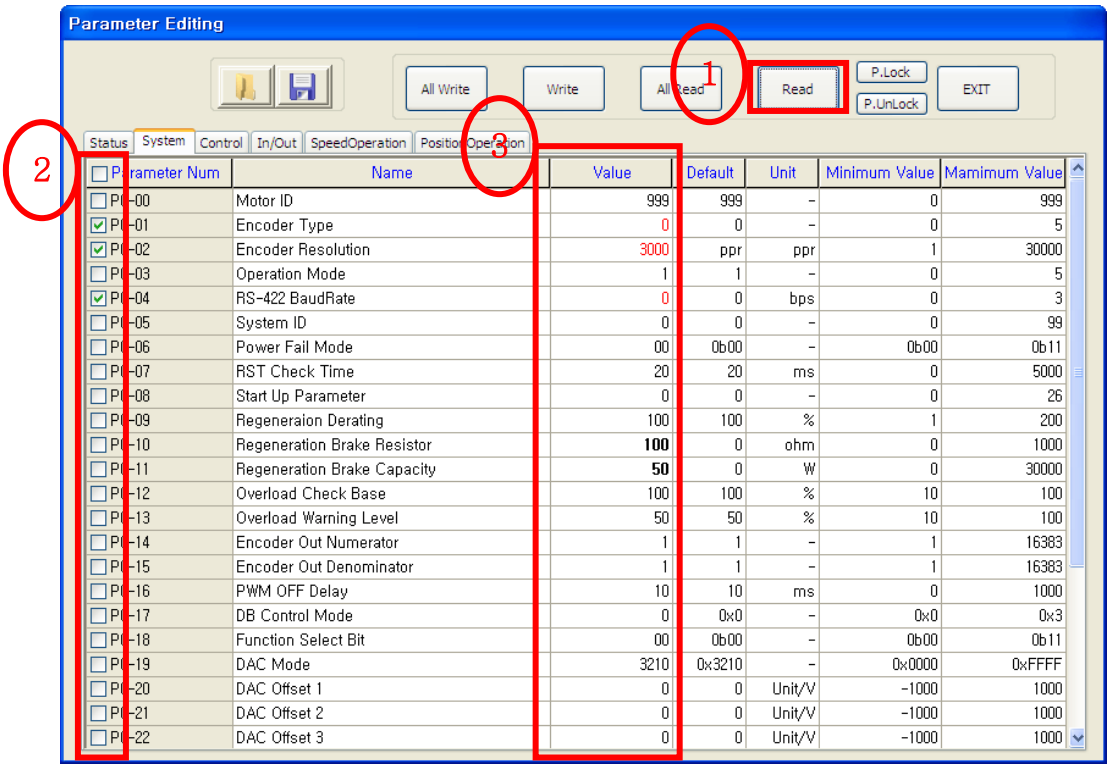
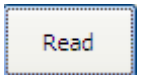


Figure 30 - Read Parameters

1. As in ② of the above <Figure 30>, check the checkbox for the parameters to read.
2. As ① in <Figure 30>, click  button to upload parameters instantly.
3. The data uploaded by Read Parameters is colored in red as in ③.
4. The color of data uploaded by Read Parameters is kept until the next command.

   When read Parameters is completed, the message box such as one in <Figure 31> appears.

Figure 31 - Message box: Read Parameters success

Click the 'OK' button in the message box in <Figure 31> to complete the Upload Parameters.

4.3.4 Parameter Data Change

Double-clicking the value cells of the parameters that needs the input of the selection type data generates the Select Help dialogue window for easy change.

Double-clicking generates a dialogue window such as in <Figure 32>. Make a selection as needed.

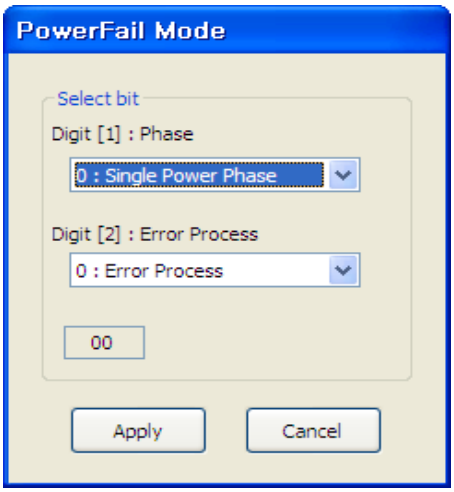


Figure 32 - POP dialogue window: Select Help window

The changed data is colored in blue.

4.3.5 Write All Parameters

The Write All Parameters function of 'LIVE - I.C.E.' downloads all parameters from 0x2000 to 0x2618.

When the parameter write is completed by 'LIVE - I.C.E.', APD-L7N Servo Drive is automatically reset.

The method to use the Write All Parameters is as follows.

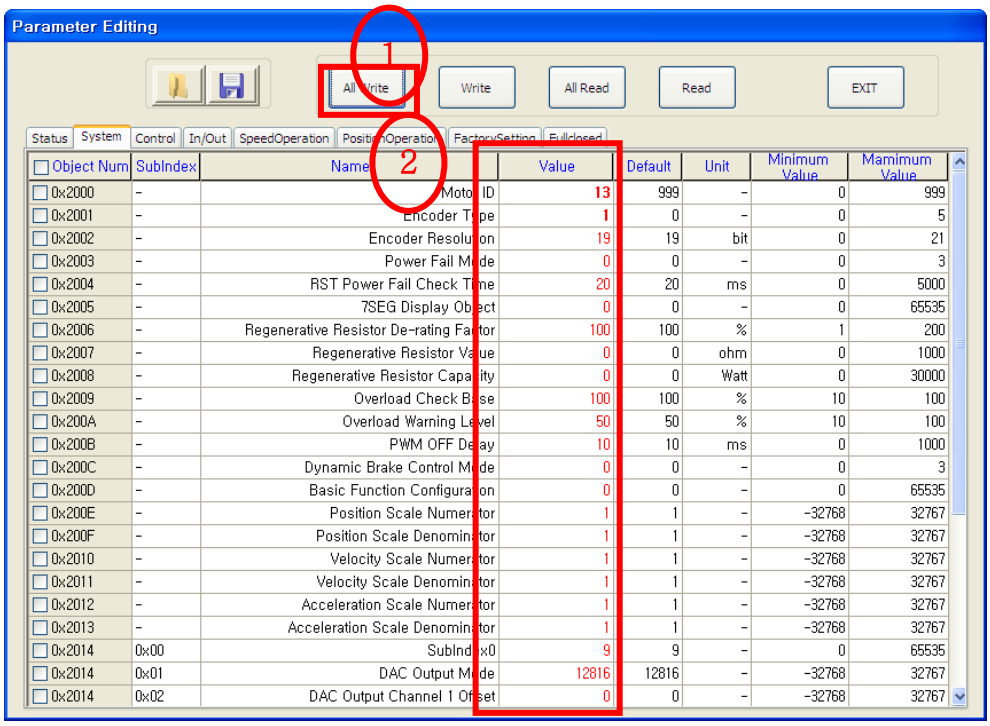
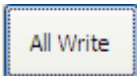


Figure 33 - Write All Parameters

1. As ① in <Figure 33>, click 

button to write all parameters instantly.
2. The data downloaded by write All Parameters is colored in red as in ②.
3. The color of data downloaded by write All Parameters is kept until the next command.

When Write All Parameters is completed, the message box such as one in <Figure 34> appears.

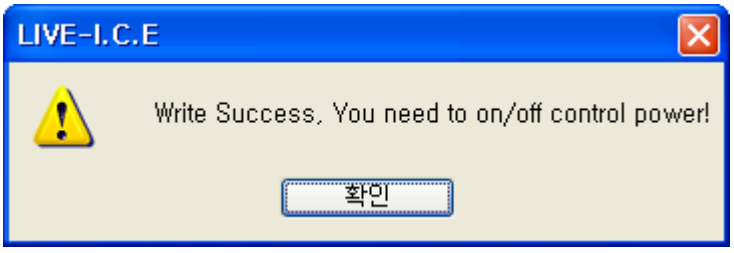


Figure 34 - Message box: Write All Parameters completed

When the parameter write is completed, APD-L7N Servo Drive is automatically reset.

⚠ Caution
For more information on the parameters that are not changed when SVON contact is on in Write All Parameters, refer to the APD-L7N Servo Drive manual.

If you write all parameters when SVON contact is on, the following message box appears.

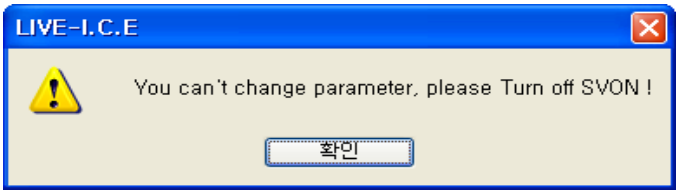


Figure 35 - Message box: Turn off SVON

4.3.6 Write Parameters

The Write Parameters function of 'LIVE - I.C.E.' downloads all parameters from 0x2000 to 0x2618 for the parameters with the checkbox checked.

When the parameter write is completed by 'LIVE - I.C.E.', APD-L7N Servo Drive is automatically reset.

The method to use the Write Parameters is as follows.

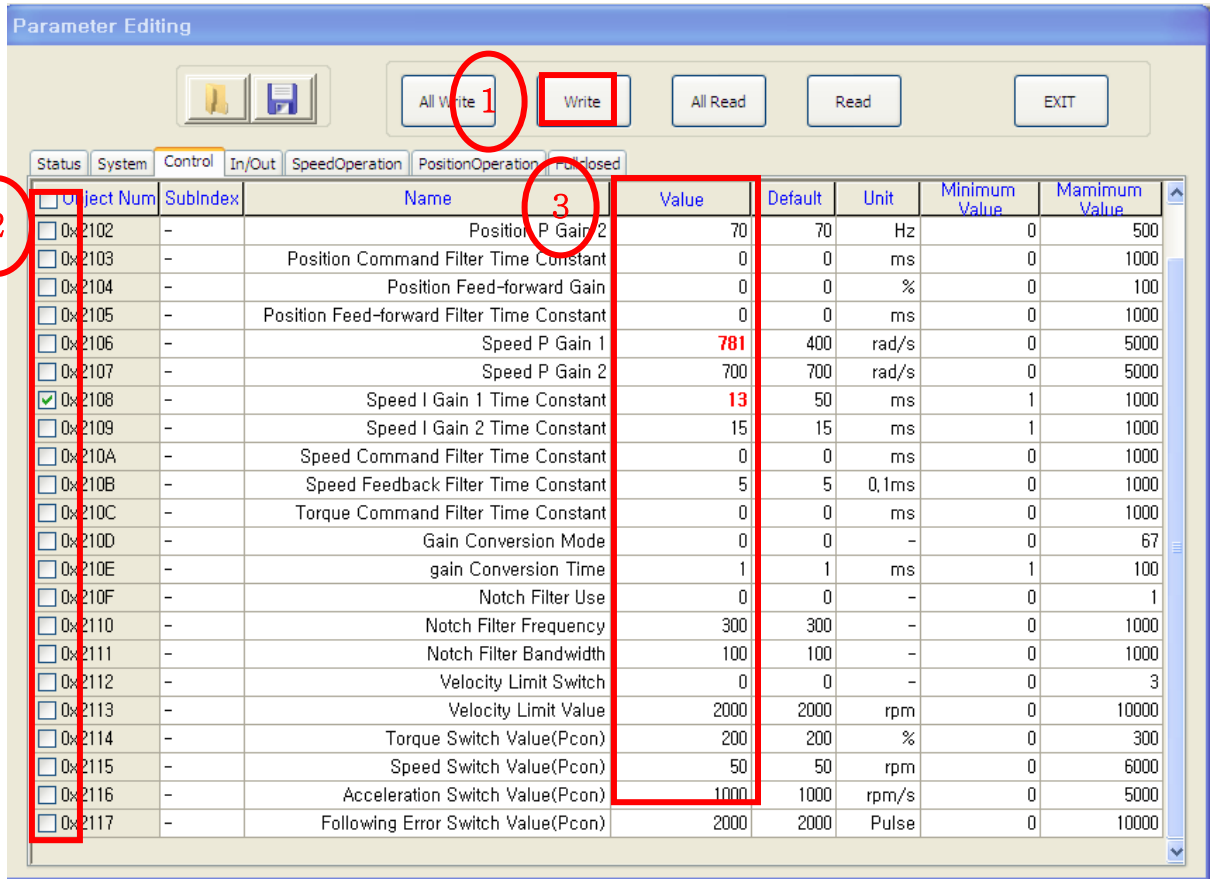
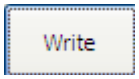


Figure 36 - Write Parameters

1. As in ② of the above <Figure 36>, check the checkbox for the parameters to write.

2. As ① in <Figure 36>, click 

button to download parameters instantly.
3. The data downloaded by Write Parameters is colored in red as in ③.
4. The color of data downloaded by Write Parameters is kept until the next command.

When the parameter Write is completed, the message box such as one in <Figure 37> appears.

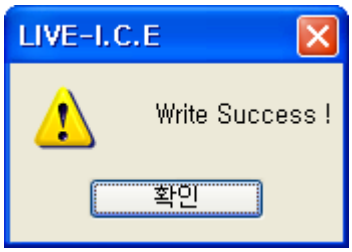


Figure 37 - Message box: Write Parameters completed

When the parameter download is completed, APD-L7N Servo Drive is automatically reset.

⚠ Caution
For more information on the parameters that are not changed when SVON contact is on in Write All Parameters, refer to the APD-L7N Servo Drive manual.

If you write all parameters when SVON contact is on, the following message box appears.

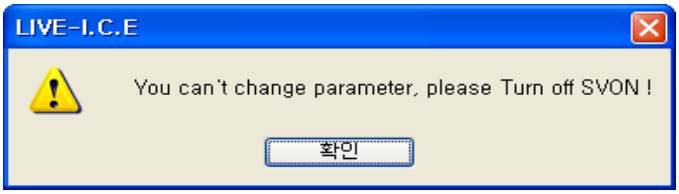


Figure 38 - Message box: Turn off SVON

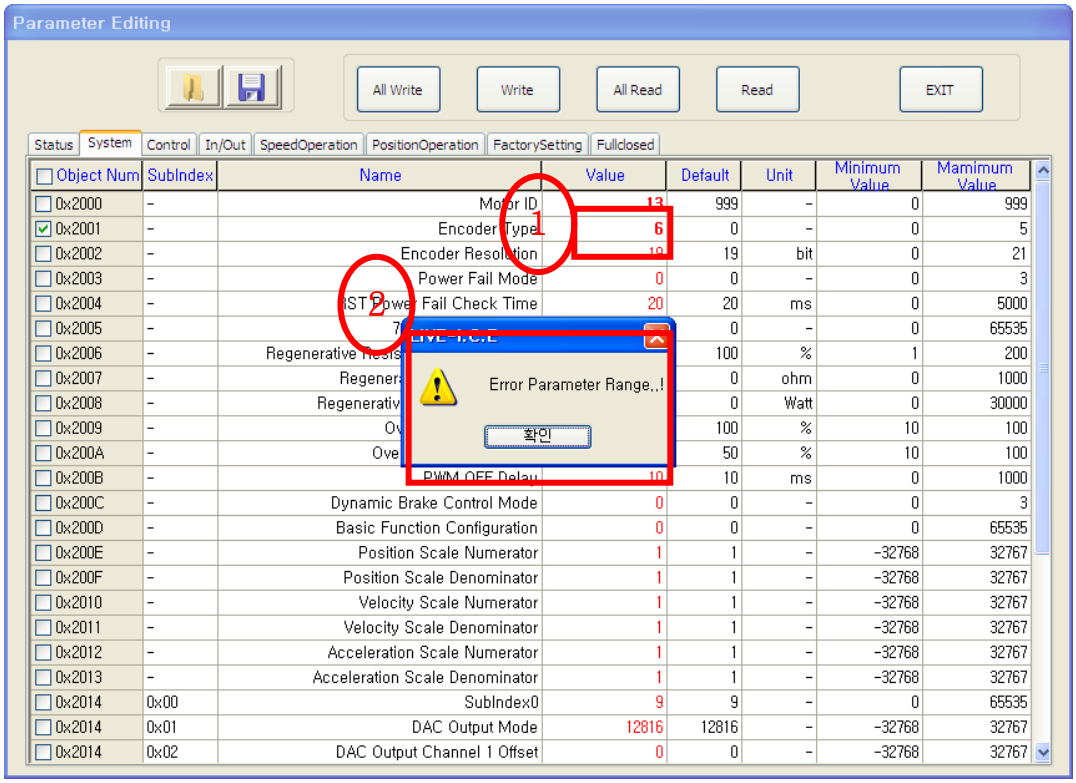


Figure 39 - Message box: Parameter Range Error

If there is a value with a different range as in ① during download as in the above <Figure 39>, the warning message window appears and at the same time the download is terminated.

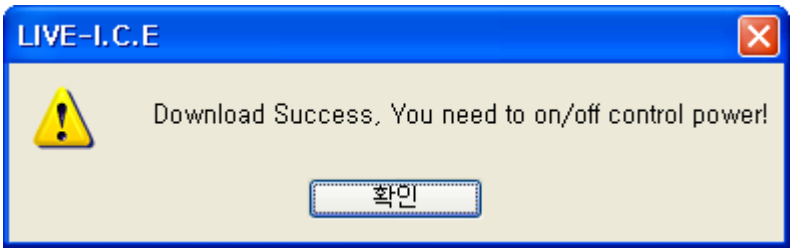


Figure 40 - Message box: Software Reset

As in the above <Figure 40>, a message window appears for the parameter that needs software reset.

4.3.7 Parameter Saving

'LIVE - I.C.E.' supports the function to save the values of the parameters 0x2000 to 0x2618.

Use 'LIVE - I.C.E.' to save parameters as in the following.

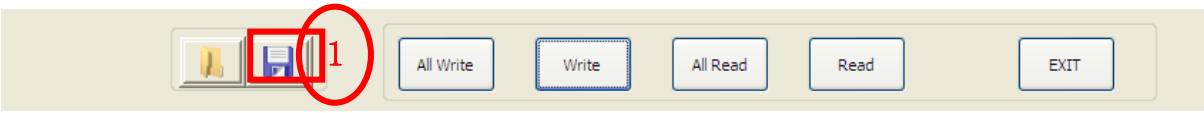


Figure 41 - Parameter Saving

As in ① of the above <Figure 41>, click  button to show the dialogue window to save a file.

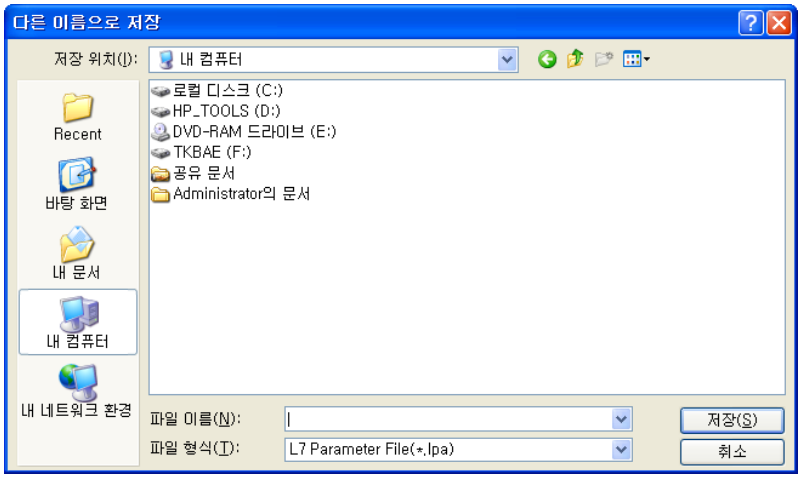


Figure 42- Parameter saving: File dialogue window

In the above <Figure 42>, set the location and name the file, and then click 'Save' button to save the file in the 'lpa' format.

4.3.8 Parameter Opening

'LIVE - I.C.E.' supports the function to read the values of 0x2000 ~ 0x2618 saved as the 'lpa' format file.

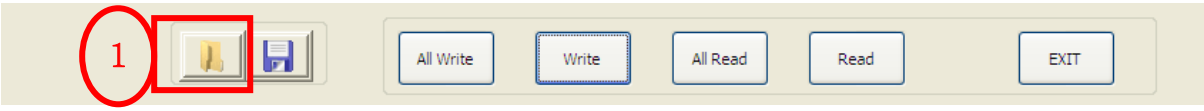


Figure 43- Parameter opening

As in ① of the above <Figure 43>, click  button to show the dialogue window.

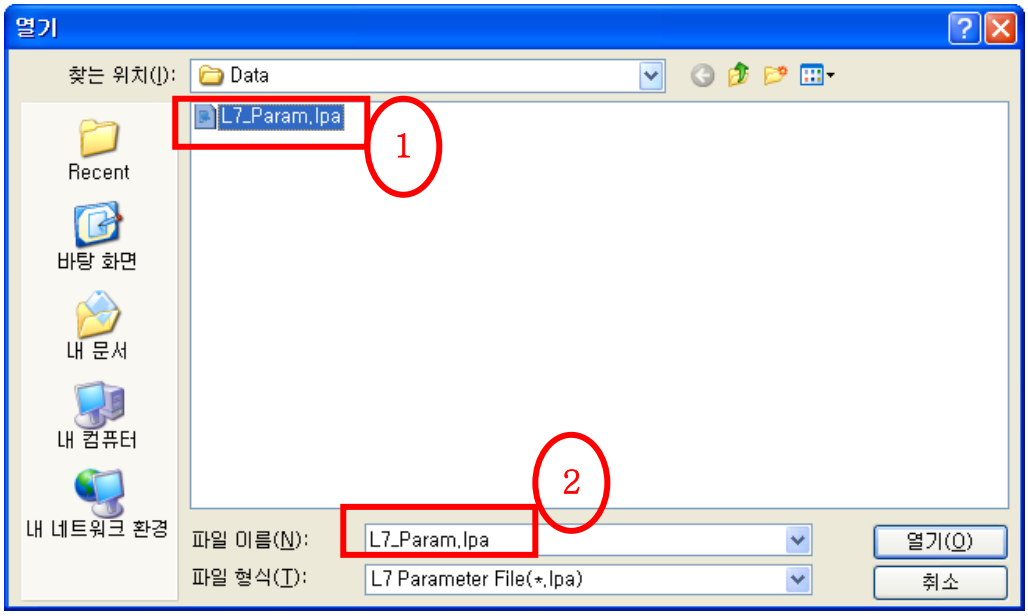


Figure 44 - Parameter opening: File dialogue window

As in ① and ② in the above <Figure 44>, select a 'lpa' file and click 'Open' button. Then the values of parameters 0x2000 to 0x2618 are displayed from the selected file.

When file opening is completed, the values are colored in blue as in ① of the following <Figure 45>.

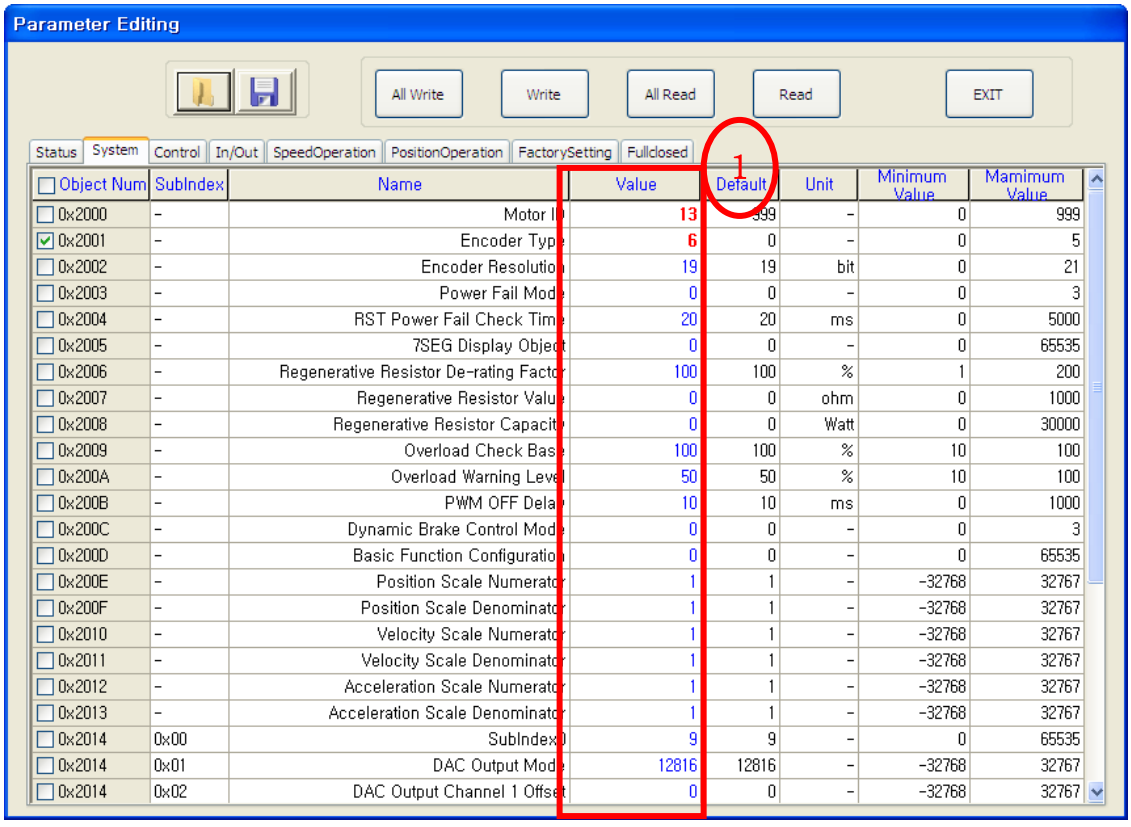


Figure 45- Parameter opening completed screen

4.3.9 Notes for Using Parameter Editing

The notes for using the Parameter Upload/Download function of 'LIVE - I.C.E.' is as follows.

- To carry out the parameter download function of 'LIVE - I.C.E.', the parameter upload must precede.
- During Servo-ON status, some parameters of APD-L7N Servo Drive parameters may not be downloaded. Therefore carry out the parameter download when Servo is off, to avoid the warning message.
- If the parameter download fails, follow the following procedure.

  a. If an alarm occurs, clear the alarm.

  b. Use the Menu Reset to initialize the parameter values.

  c. Try the parameter download again.

4.4 Manual JOG

The Manual JOG function of 'LIVE - I.C.E.' performs a manual JOG operation for APD-L7N Servo Drive in forward and reverse direction.

The JOG operation is performed according to the JOG speed in 0x2305.

4.4.1 Manual JOG Start

The Manual JOG function of 'LIVE - I.C.E.' is interoperable with Real-time Monitoring, Data Trace (real-time graph) or Parameter Editing.

Start the Manual JOG function of 'LIVE –ICE.' as in the following.

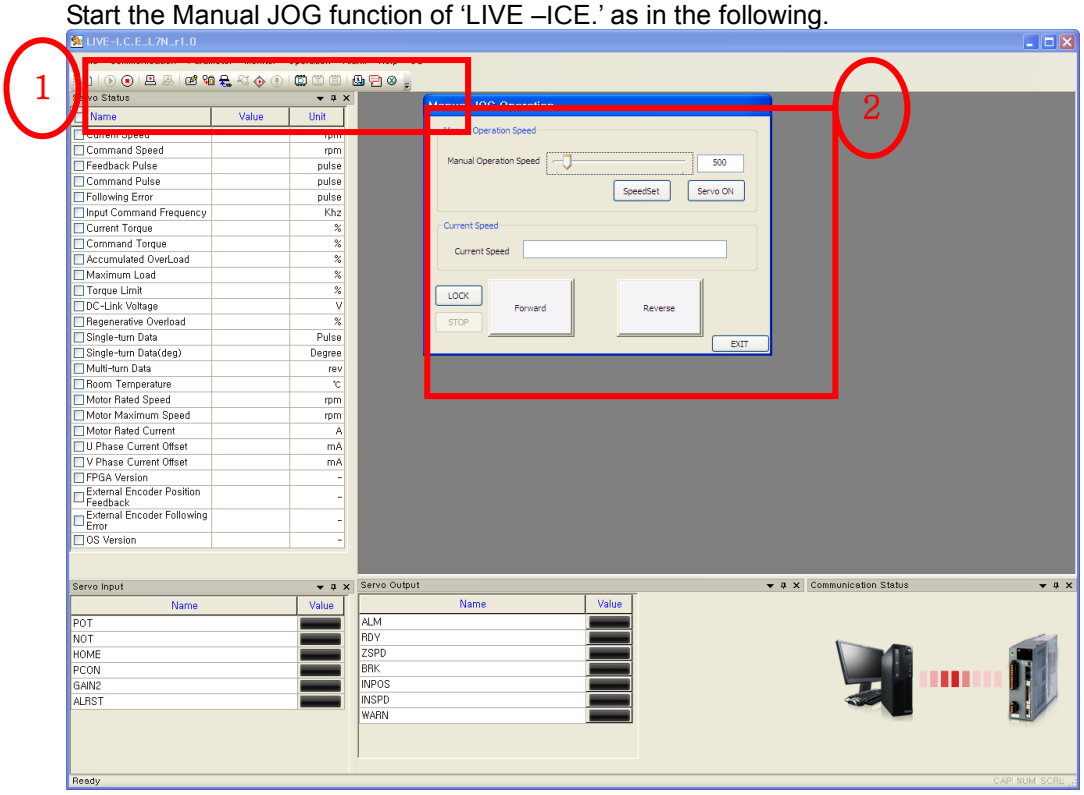


Figure 46- Manual JOG screen

1. In ① of the above <Figure 46>, select Operation -> Manual Test Operation or click icon to activate the Manual JOG dialogue window as in ②.

4.4.2 Manual JOG Operation

Start 'LIVE - I.C.E.' Manual JOG after setting 0x2305 JOG operation speed and Servo ON.

The current speed is displayed, only supporting the forward/reverse directions.

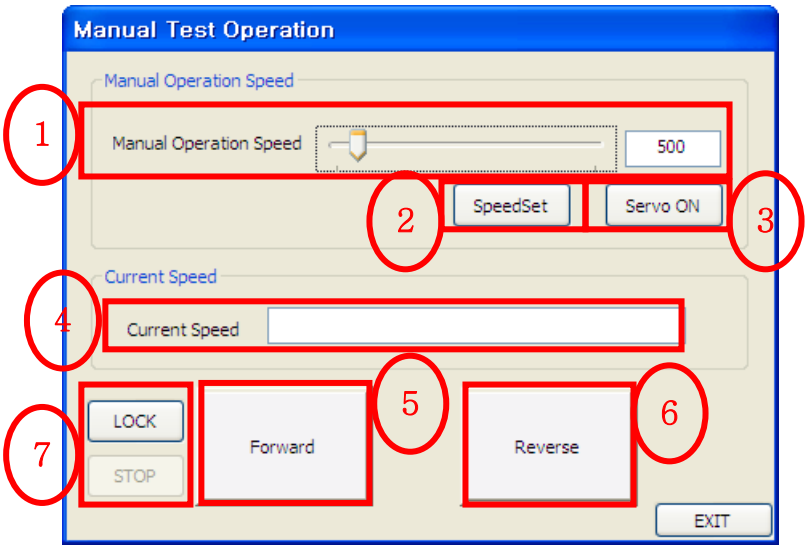


Figure 47- Manual JOG operation screen

1. As in ① of the above <Figure 47>, 0x2305 speed may be redefined. You can use the scroll bar to change it, or enter it in the text input box.
2. If you selected ①, then click ② of the above <Figure 47> to save the changed speed in APD-L7N Servo Drive.
3. When all setting is completed, click ③ of the above <Figure 47> to turn on APD-L7N Servo Drive's SVON contact manually.

   On clicking SVON ON button, the dialogue window as in the following <Figure 48> appears. To turn the SVON contact on, click 'Yes'.

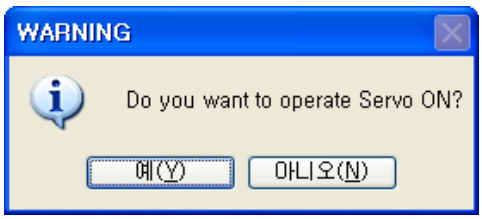
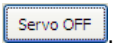


Figure 48- Message: Confirm SVON ON/OFF

   In the above <Figure 47>, the ② Button is changed to 

. Check if the SVON is off, when terminating the function.

4. In the above <Figure 47>, when you click and hold the ⑤ button, the button color turns light pink, operating in the forward direction.
5. In the above <Figure 47>, when you click and hold the ⑥ button, the button color turns light pink, operating in the reverse direction.
6. While clicking and holding the button, the current speed is displayed in ④ of the above <Figure 47>.

7. If you select ⑦ UNLOCK button in Figure 47 above, it only operates by clicking ⑤, ⑥button. If you select LOCK ,click ⑤, ⑥button for only one time. if you want to stop, click STOP button.

   If you click ⑤ or ⑥ in <Figure 47> with SVON contact off, a warning message appears as in the following <Figure 49>.

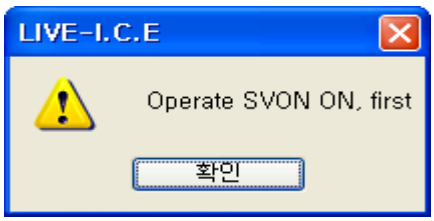


Figure 49- Message: SVON contact warning window

   Keep in mind that the SVON contact must be always on to use the Manual JOG function.

8. After testing, the JOG operation speed is initialized again to the initial speed(before changing).

⚠ Caution
If the SVON contact is still on after terminating the Manual JOG function, you may have a problem with APD-L7N Servo Drive operation. Therefore you should always check the SVON contact status after termination.

4.4.3 How to handle when the SVON contact is on after terminating the Manual Jog

1. Turn off the main power of APD-L7N Servo Drive.
2. Turn off and then turn on the control power of APD-L7N Servo Drive.

4.5 Program JOG

The Program JOG function of 'LIVE - I.C.E.' performs a JOG operation automatically for APD-L7N Servo Drive.

The JOG operation is performed according to the operating setting in 0x2306 ~ 230D

4.5.1 Program JOG Start

The Program JOG function of 'LIVE - I.C.E.' is interoperable with Real-time Monitoring, Data Trace (real-time graph) or Parameter Editing.

Start the Manual JOG function of 'LIVE –ICE.' as in the following.

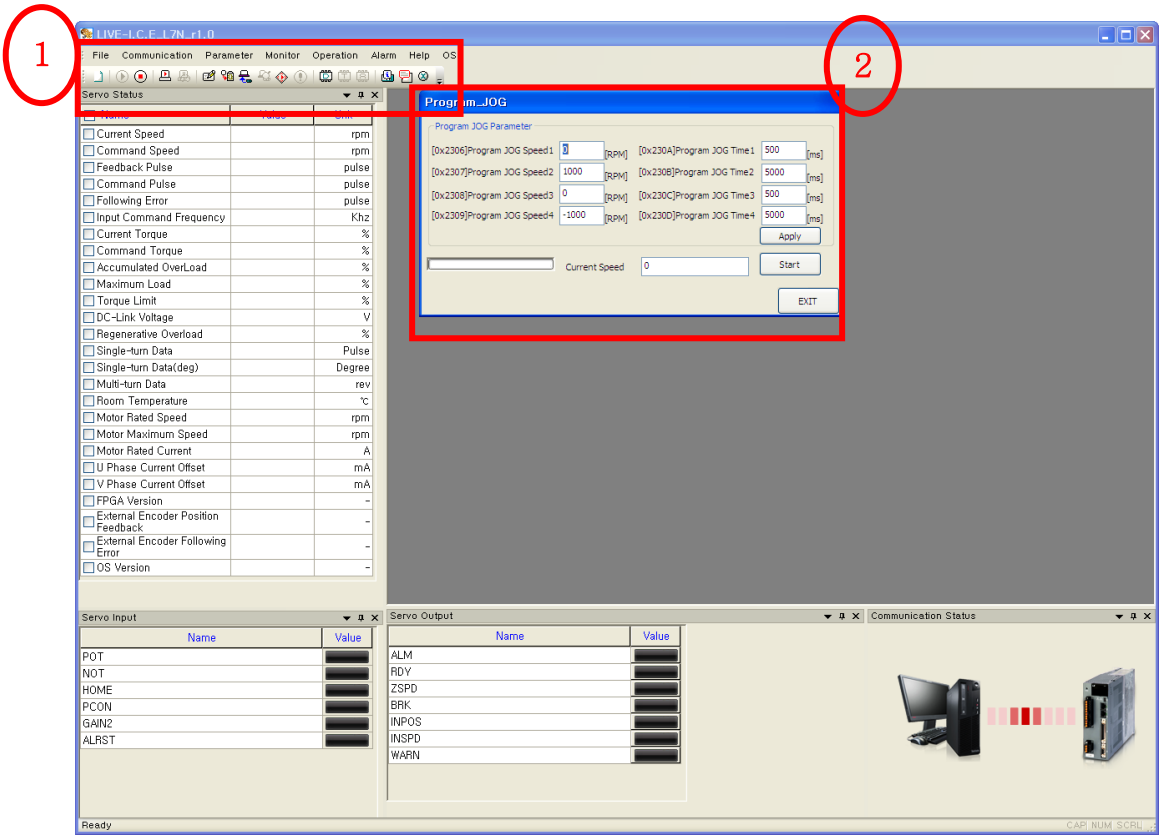


Figure 50- Manual JOG screen

In ① of the above <Figure 50>, select Operation -> Program JOG Operation or click  icon to activate the Program JOG dialogue window as in ②.

4.5.2 Program JOG Operation

Start 'LIVE - I.C.E.' Program JOG as belows.

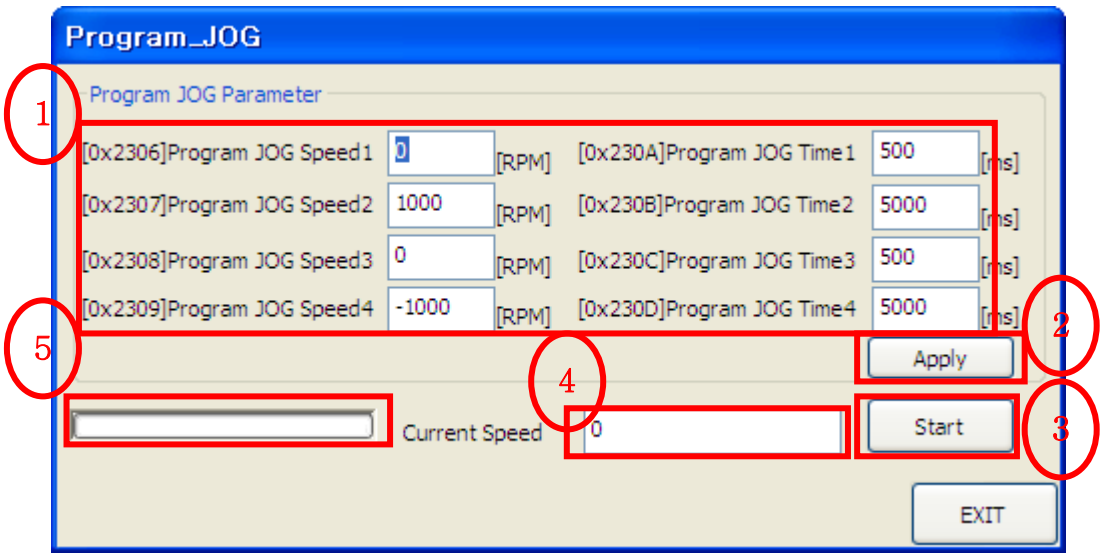


Figure 51- Program JOG operation screen

1. As in ① of the above <Figure 51>, Initial set parameter data is uploaded.
2. If you selected ①, then click ② of the above <Figure 51> to save the changed speed in APD-L7N Servo Drive.
3. When all setting is completed, click ③ of the above <Figure 51> to turn on APD-L7N Servo Drive's SVON contact automatically.

   On clicking SVON ON button, the dialogue window as in the following <Figure 52> appears. To turn the SVON contact on, click 'Yes'.

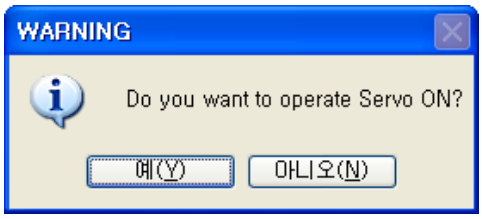
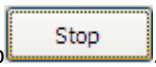


Figure 52- Message: Confirm SVON ON/OFF

In the above <Figure 51>, the ② Button is changed to 

. Check if the SVON is off, when terminating the function.

⚠ Caution
If the SVON contact is still on after terminating the Program JOG function, you may have a problem with APD-L7N Servo Drive operation. Therefore you should always check the SVON contact status after termination.

4.5.3 How to handle when the SVON contact is on after terminating the Program Jog

1. Turn off the main power of APD-L7N Servo Drive.
2. Turn off and then turn on the control power of APD-L7N Servo Drive.

4.6 Gain Auto Tuning

The Gain Auto Tuning function of 'LIVE - I.C.E.' uses the motor connected to APD-L7N Servo Drive to set the gain automatically.

4.6.1 Gain Auto Tuning Start

The 0x2100's estimated inertia ratio is uploaded before tuning and, when Gain Auto Tuning is complete, the P1-00's estimated inertia ratio is uploaded again and displayed.

Start the Gain Auto Tuning function of 'LIVE - I.C.E.' as in the following.

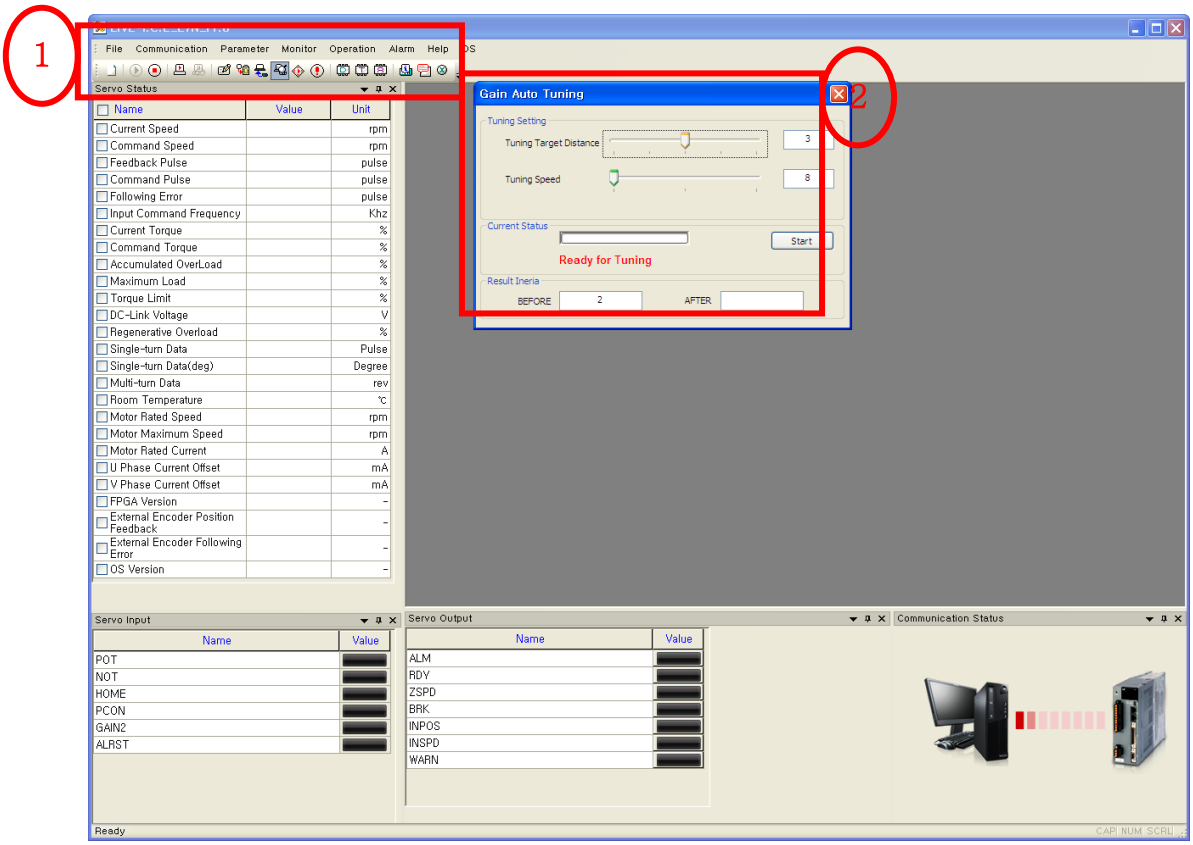


Figure 53- Gain Auto Tuning screen

1. In ① of the above <Figure 53>, select Operation -> Gain Auto Tuning or click  icon to activate the Gain Auto Tuning dialogue window as shown in ②.

4.6.2 Gain Auto Tuning Operation

Start the Gain Auto Tuning function of 'LIVE - I.C.E.' after setting Tuning's target distance and speed.

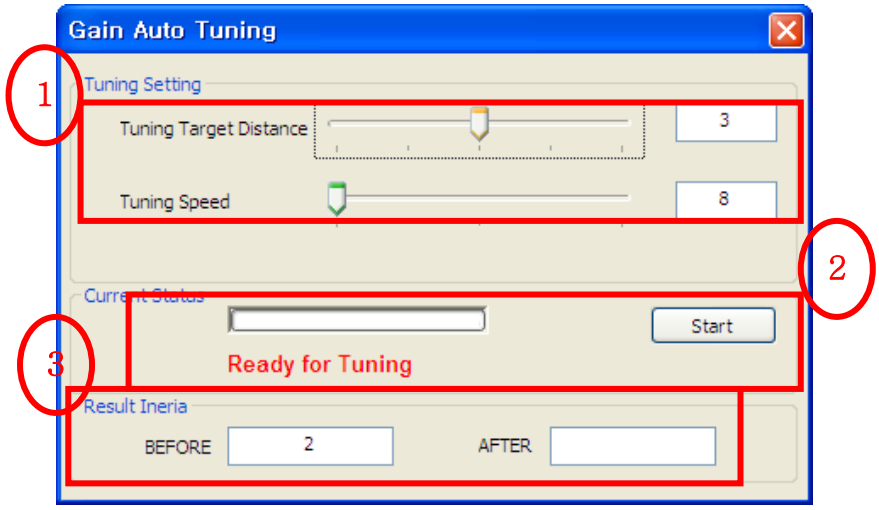


Figure 54- Gain Auto Tuning operation screen

1. As shown in ① in the above <Figure 54>, you can modify the parameters of Gain Tuning Speed and Gain Tuning Distance. You can use stroll bar or enter in the text input box.

2. Click the Start button in ②of the above <Figure 54> to start Gain Auto Tuning.

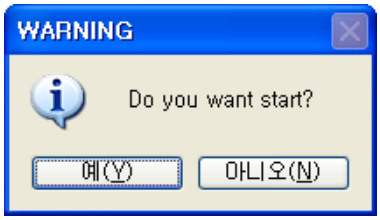


Figure 55- Message: Start confirmation window

A dialogue window appears as shown in the above <Figure 55>.

If you want to start Gain Auto Tuning, click 'Yes' button.

3. As shown in <Figure 56>, if Gain Auto Tuning is in operation, 'Ready for Tuning' is changed to 'Start Gain Auto Tuning' in the red color and the Start button is changed to the Stop button. You can check the current progress status by the progress bar animation.

Figure 56- In Gain Auto Tuning

4. When Gain Auto Tuning is completed, a dialogue as shown in the following <Figure 57> appears.

Figure 57- Confirm Gain Auto Tuning stop

5. Click 'OK'. The final screen is the dialogue window as shown in the following <Figure 58>.

As shown in ① of the following <Figure 58>, the estimated inertia ratios before and after tuning are displayed.

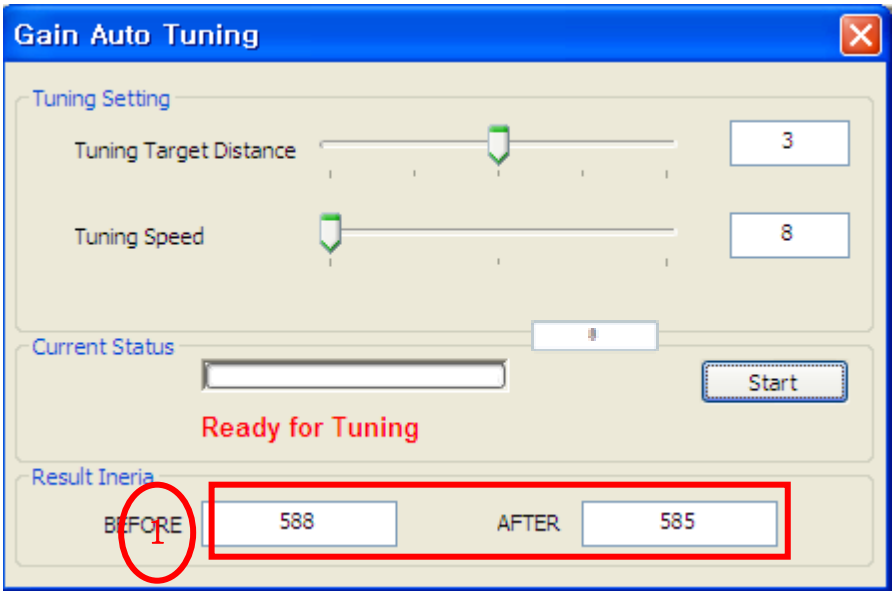


Figure 58- Gain Auto Tuning completed screen

4.7 Graph Output

The Graph Output function of 'LIVE - I.C.E.' provides three graph output functions: Real-time DataTrace, Trigger Monitoring and Alarm Trace

It also includes functions of saving and outputting the graph data file.

Trigger Monitoring and Alarm Trace functions, except Data Trace, are not supported during the real-time monitoring.

4.7.1 Graph Channel Table

'LIVE-I.C.E' provides four channels and they are selectable.

The channel table in the following <Table 12> is based on the initial contact status.

Table 12 - Graph Channel Table

Value	Description
0	Not Use
1	Current Speed[rpm]
2	Command Speed[rpm]
3	Input Pulse Frequency[kpps]
4	Current Torque[%]
5	Command Torque[%]
6	Torque Limit[%]
7	DC Link Voltage[v]
8	Servo On (Digital Input)
9	Speed 1 (Digital Input)
10	Speed 2 (Digital Input)
11	Speed 3 (Digital Input)
12	Direction (Digital Input)
13	In Speed (Digital Output)
14	In Position (Digital Output)
15	Torque Limit Output (Digital Output)
16	Alarm (Digital Output)

4.7.2 DataTrace Start

DataTrace is a real-time graphing function that outputs the graphs of data values in real time based on the initial setting. DataTrace is **interoperable with real-time monitoring, Parameter Editing and Manual JOG functions**.

Start the DataTrace function of 'LIVE - I.C.E.' as in the following.

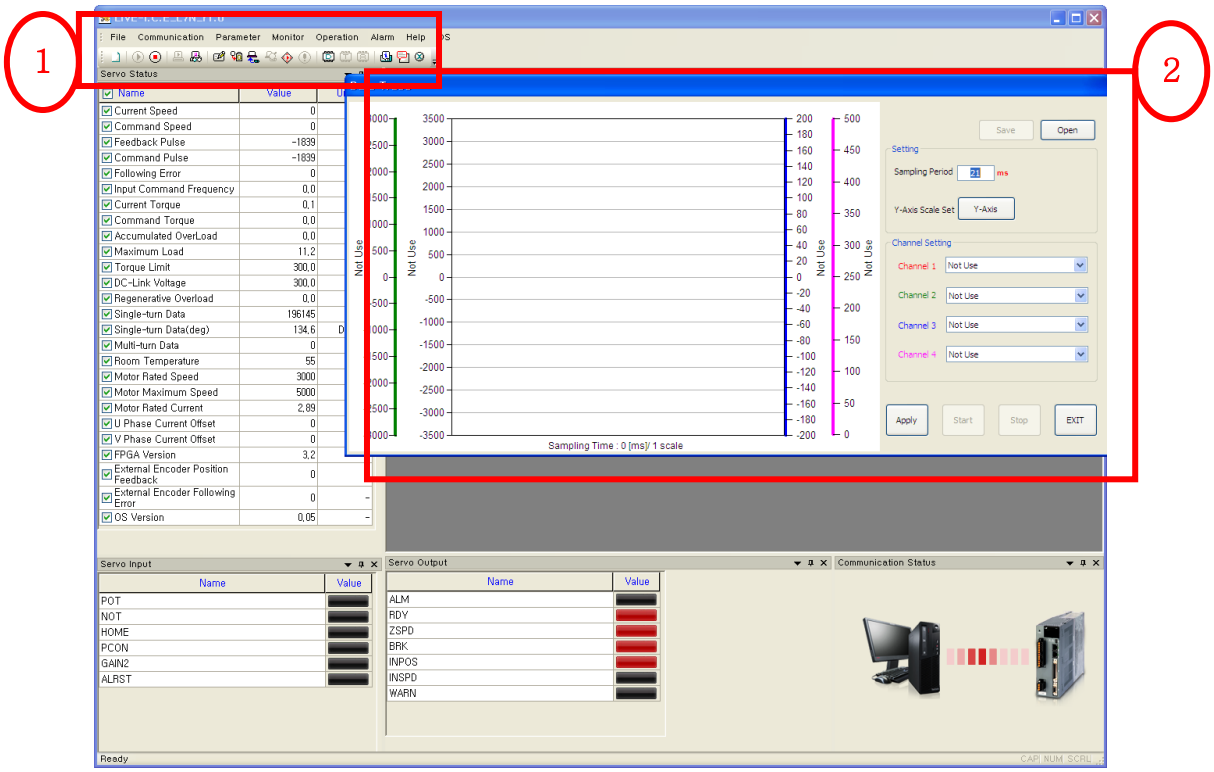


Figure 59- DataTrace start screen

1. In ① of <Figure 59>, select Monitor -> Cyclic Monitoring -> DataTrace or click  icon to activate DataTrace dialogue window as shown in ②.

Table 13 - DataTrace Graph properties

Category	Details
Data Sampling Time	Support 10ms to 200ms
X-axis	- Scale Size: 20ms* Sampling Period/scale
	- Initial scale size fixed (drag to enlarge)
Y-axis	- Scale size adjustable (not changeable during operation)
	- Y-axis 1: Channel 1 (red graphic line)
	- Y-axis 2: Channel 2 (green graphic line)
	- Y-axis 3: Channel 3 (blue graphic line)
	- Y-axis 4: Channel 4 (pink graphic line)

4.7.3 DataTrace Operation

DataTrace has Sampling Period, Y-Axis Scale Set and Channel Setting as the initial settings.

Operate according to the sequence in the following <Figure 61>.

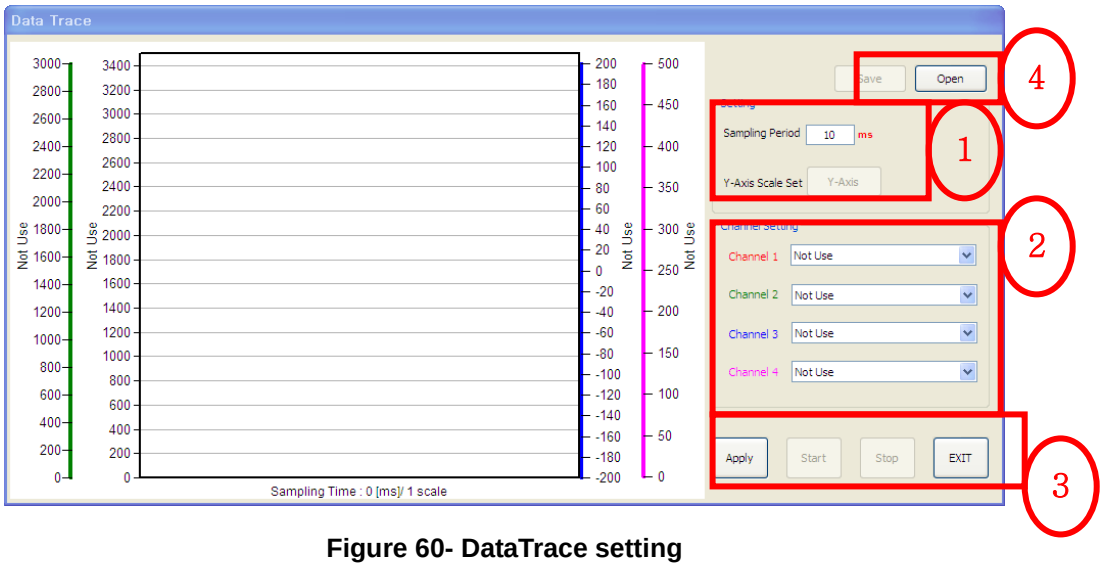


Figure 60- DataTrace setting

1. Enter Sampling Period in ① of the above <Figure 60>.
2. Click Y-Axis button in ① of the above <Figure 60> to adjust the Y-axis scale.
3. Set the channels in ② of the above <Figure 60>.
4. Click Apply button in ③ of the above <Figure 60> to save the settings of Paragraphs 1 and 3 in APD-L7N Servo Drive, which then makes preparation for operation. The Start and Stop buttons are activated.
5. Click Start button in ③ of the above <Figure 60> to operate graph function. The Stop button is activated.
6. If you want to terminate the Graph function, click Stop button in ③ of the above <Figure 60>.

The following <Figure 61> shows the screen you will see when you finish the above process properly.

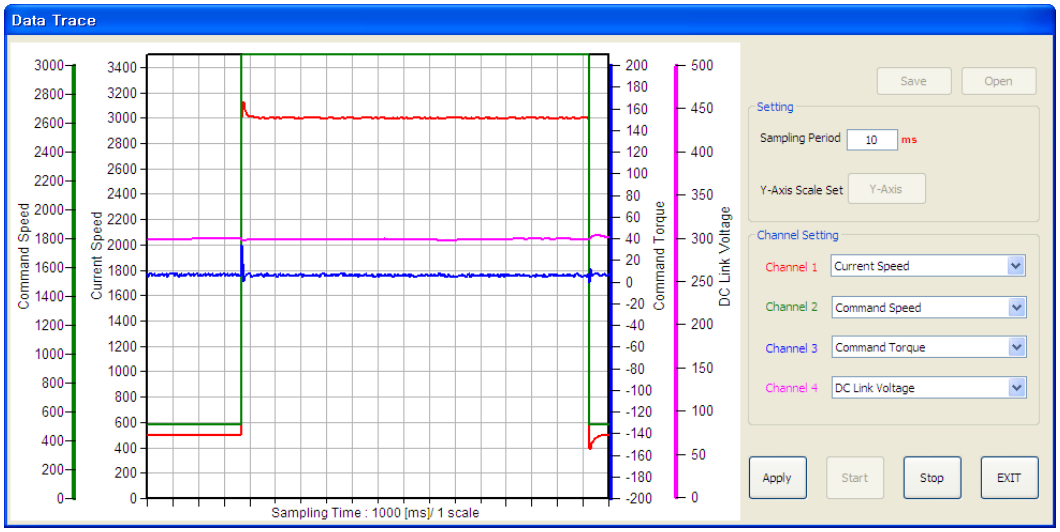


Figure 61- DataTrace operation screen

4.7.4 DataTrace File Saving and Opening

The Graph function of 'LIVE-I.C.E.' provides file saving and opening.

1. Click Save button in ④ of the above <Figure 62> to see the following screen.

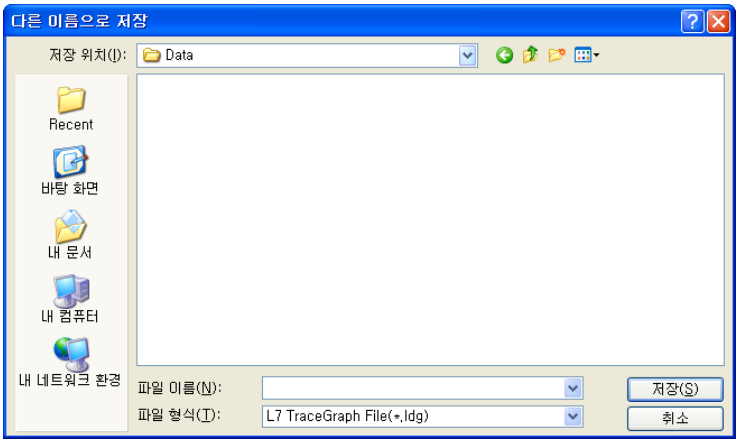


Figure 62- DataTrace saving: File dialogue window

In the above <Figure 62>, set the location and name the file, and then click 'Save' button to save the file in the 'ldg' format.

2. Click Open button in ④ of the above <Figure 60> to see the following screen.

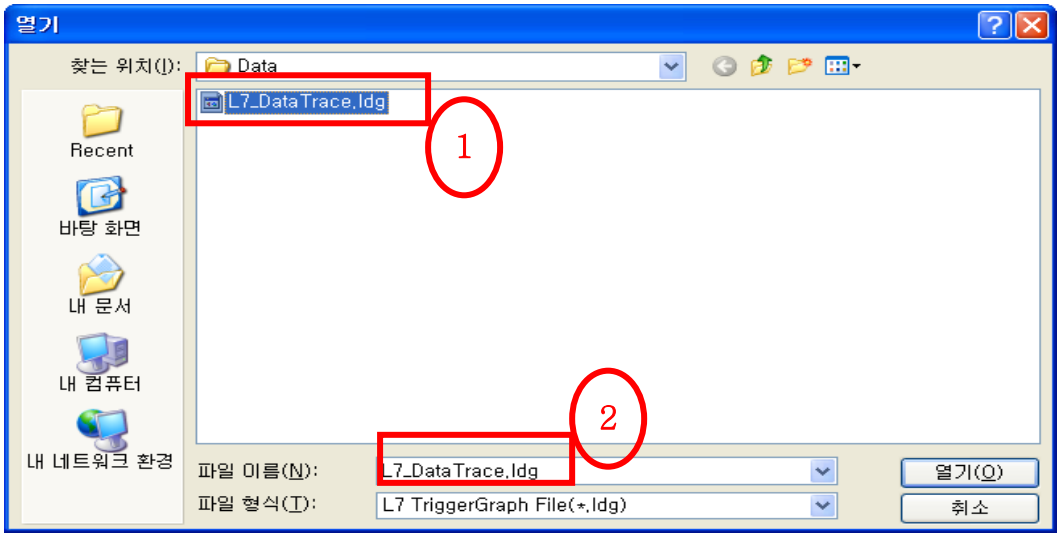


Figure 63- DataTrace opening: File dialogue window

As in ① and ② in the above <Figure 63>, select a 'ldg' file and click 'Open' button. Then the Graph data are displayed from the selected file.

4.7.5 Trigger Trace Start

The Trigger Trace function is to graph the data when a certain value is reached. It outputs the data in graph based on the initial setting.

Start the Trigger Trace function of 'LIVE - I.C.E.' as in the following.

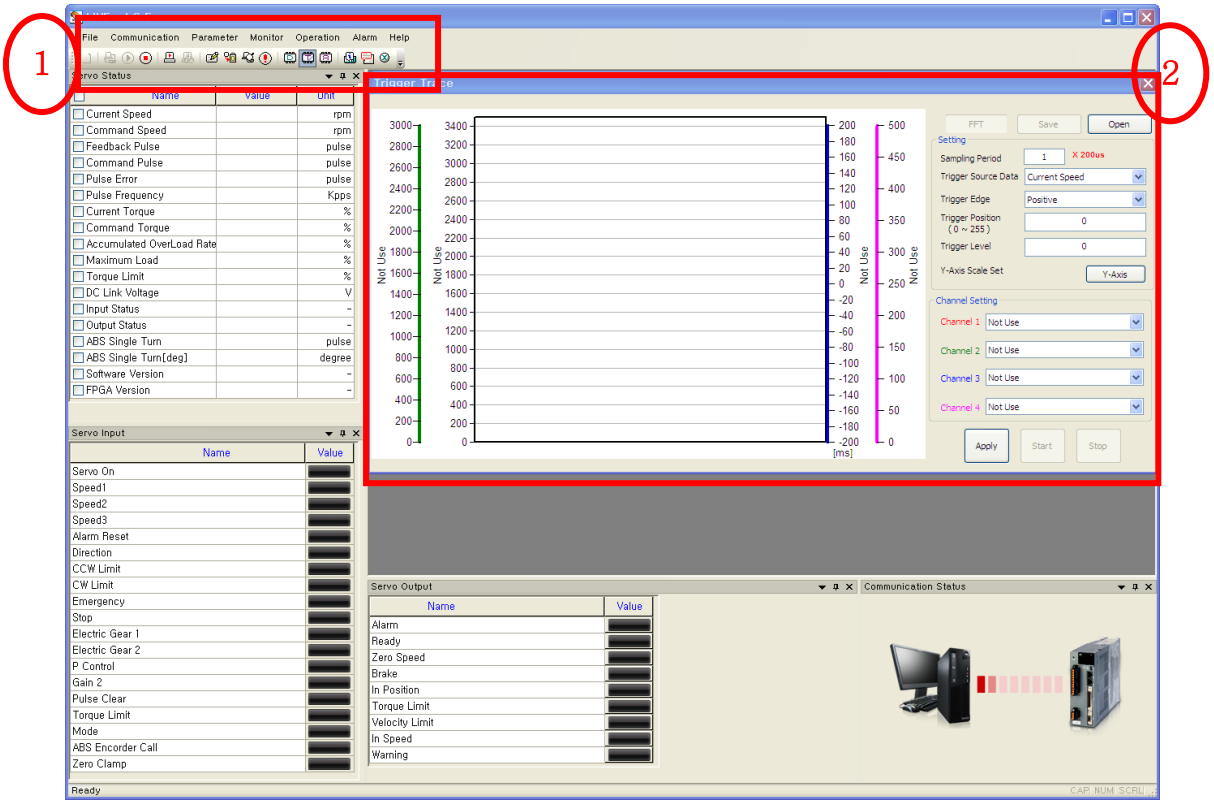


Figure 64- Trigger Trace start screen

1. In ① of <Figure 64>, select Monitor -> Trigger Monitoring or click icon to activate Trigger Trace dialogue window as shown in ②.

Table 14 - Trigger Graph properties

Category	Details
Data Sampling Time	Support 200us to 200ms
X-axis	- Scale Size: 200us*Sampling Period/scale
	- Initial scale size fixed (drag to enlarge)
Y-axis	- Scale size adjustable (not changeable during operation)
	- Y-axis 1: Channel 1 (red graphic line)
	- Y-axis 2: Channel 2 (green graphic line)
	- Y-axis 3: Channel 3 (blue graphic line)
	- Y-axis 4: Channel 4 (pink graphic line)

4.7.6 Trigger Trace Operation

Trigger Trace has Sampling Period, Y-Axis Scale Set, Channel, Trigger Source Data, Trigger Edge, Trigger Position and Trigger Level as the initial settings.

Operate according to the sequence in the following <Figure 65>.

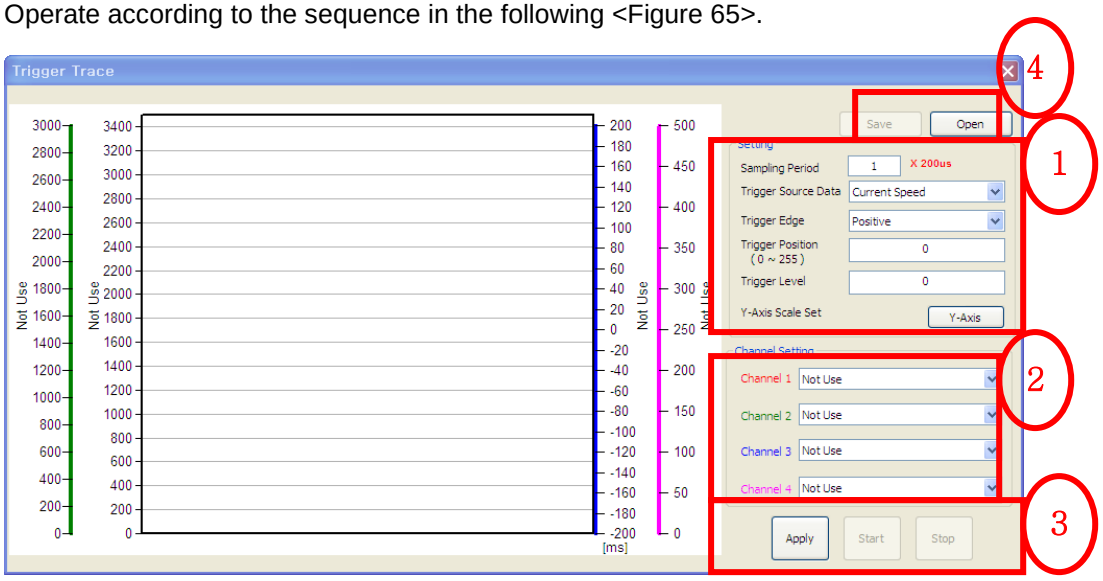


Figure 65- Trigger Trace setting

1. Enter Sampling Period in ① of the above <Figure 65>.

   Set the basic setting for Trigger Trace according to the conditions in the following <Table 15>.

Table 15 - Trigger Trace initial setting

Variable name	Range	Description
Trigger Source Data	1~20	1~20: Refer to Table 12
Trigger Edge	0~1	0 : Rising Edge, 1 : Falling Edge
Trigger Position	0~255	Data shift count assuming that 255 is 100%.

Variable name	Range	Description
Trigger Level	- ~ +	Usable within the margin of error
Array Start Pointer	0~255	Start position on the Ring Buffer when displaying the graph

2. Click Y-Axis button in ① of the above <Figure 65> to adjust the Y-axis scale.

3. Set the channels in ② of the above <Figure 65>.

4. Click Apply button in ③ of the above <Figure 65> to save the settings of Paragraphs 1 and 3 in APD-L7N Servo Drive, which then makes preparation for operation. The Start and Stop buttons are activated.

5. Click Start button in ③ of the above <Figure 65> to operate graph function. The Stop button is activated.

6. If you want to terminate the Graph function, click Stop button in ③ of the above <Figure 65>.

The following <Figure 66> shows the screen you will see when you finish the above process properly.

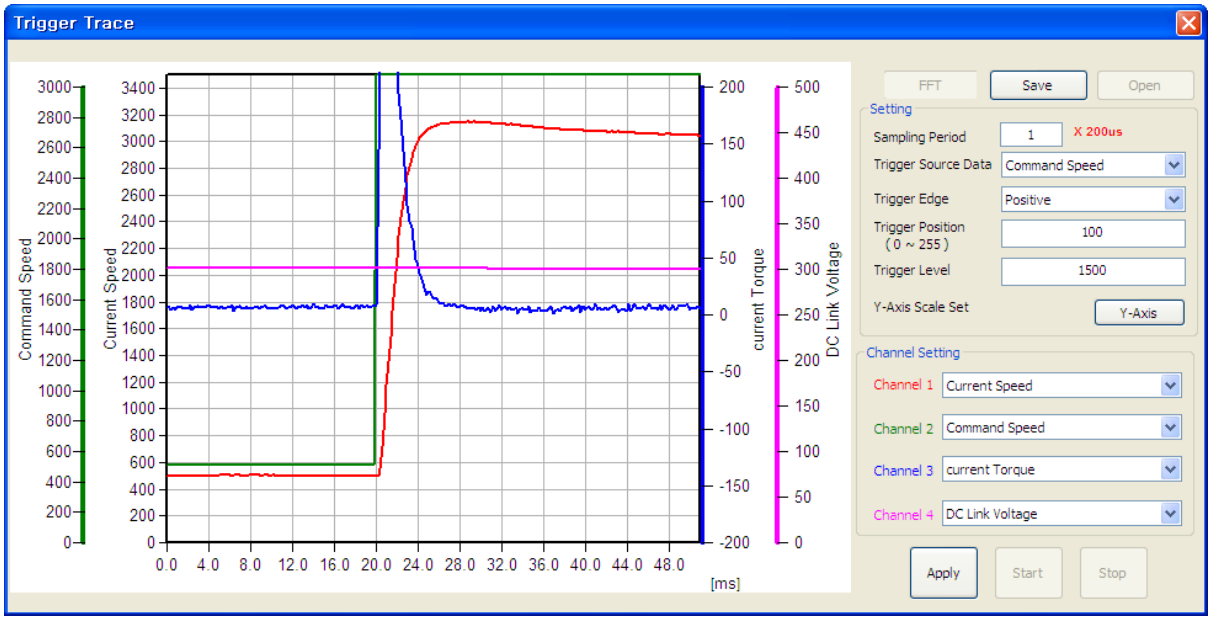


Figure 66- Trigger Trace operation screen

4.7.7 Trigger Trace File Saving and Opening

The Graph function of 'LIVE-I.C.E.' provides file saving and opening.

1. Click Save button in ④ of the above <Figure 65> to see the following screen.

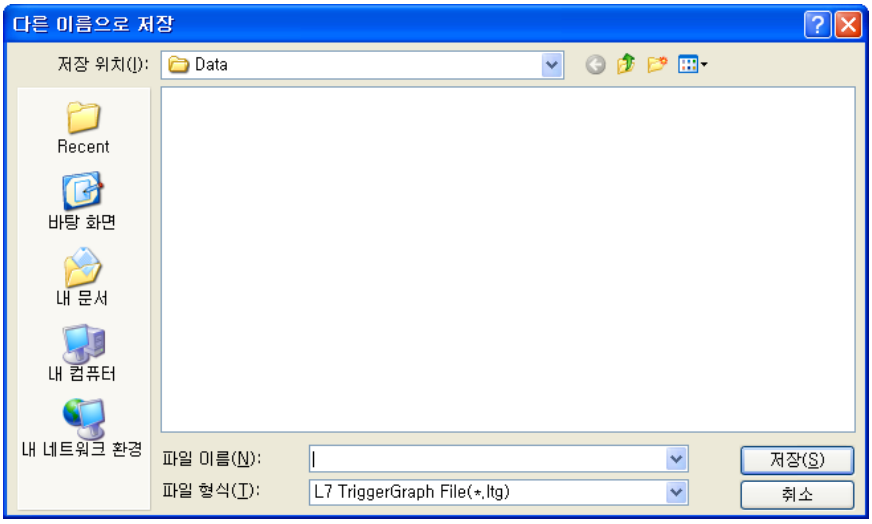


Figure 67- Trigger Trace saving: File dialogue window

In the above <Figure 67>, set the location and name the file, and then click 'Save' button to save the file in the 'ltg' format.

2. Click Open button in ④ of the above <Figure 65> to see the following screen.

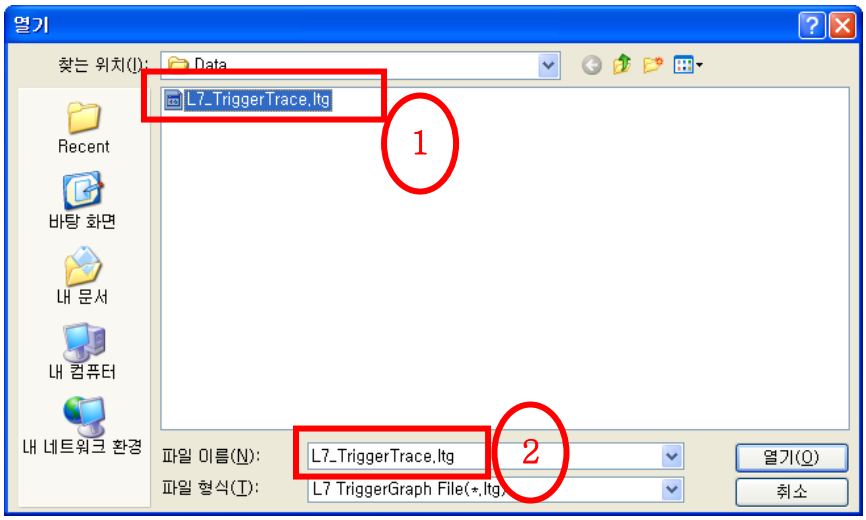


Figure 68- Trigger Trace opening: File dialogue window

As in ① and ② in the above <Figure 65>, select a 'ltg' file and click 'Open' button. Then the Graph data are displayed from the selected file.

4.7.8 Alarm Trace Start

The Alarm Trace function is to graph the data when an alarm occurs. It outputs the data in graph based on the initial setting.

Start the Alarm Trace function of 'LIVE-I.C.E.' as in the following.

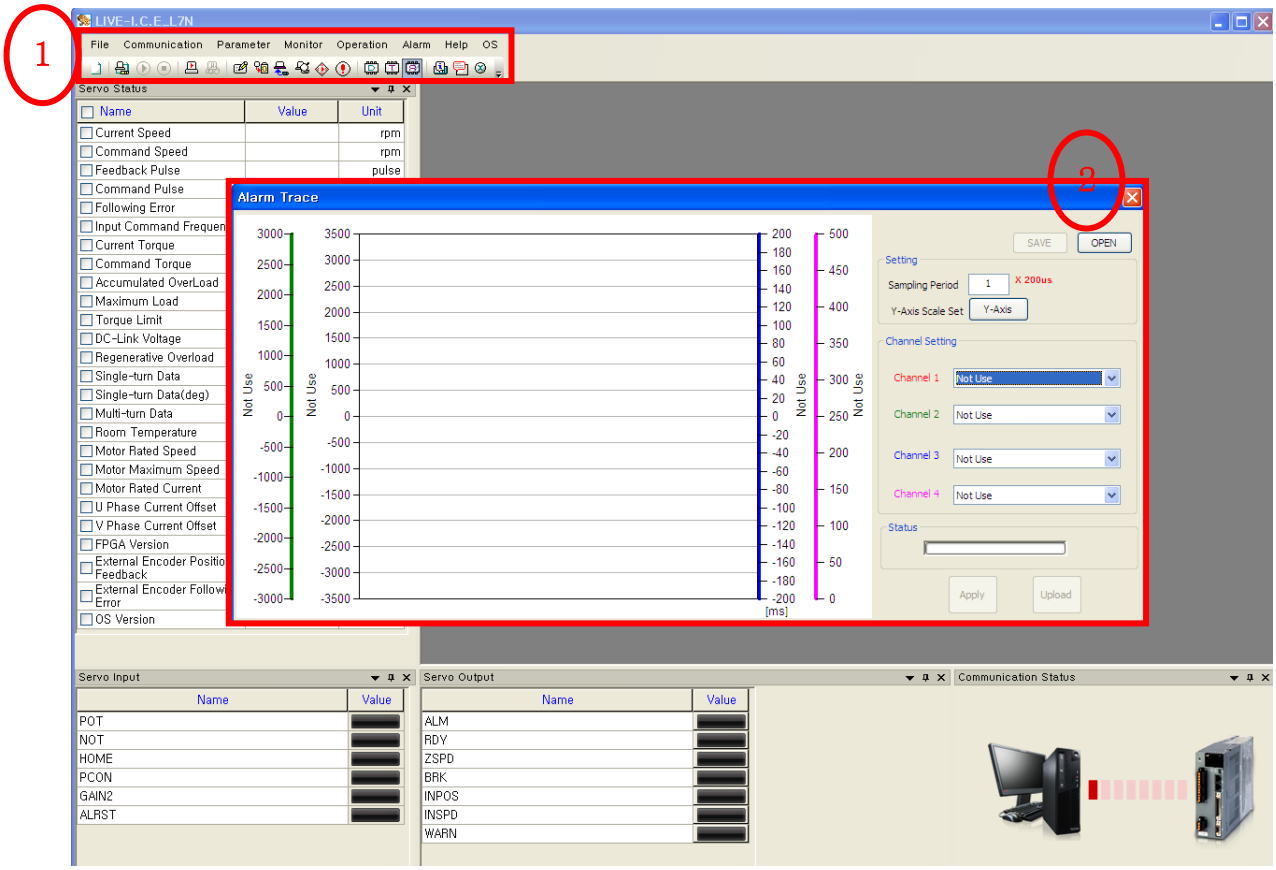


Figure 69- Alarm Trace start screen

1. In ① of <Figure 69>, select Alarm -> Alarm Trace or click icon to activate Alarm Trace dialogue window as shown in ②.

Table 16 - Alarm Graph properties

Category	Details
Data Sampling Time	Support 200us to 200ms
X-axis	- Scale Size: 200us*Sampling Period/scale
	- Initial scale size fixed (drag to enlarge)
Y-axis	- Scale size adjustable (not changeable during operation)
	- Y-axis 1: Channel 1 (red graphic line)
	- Y-axis 2: Channel 2 (green graphic line)
	- Y-axis 3: Channel 3 (blue graphic line)
	- Y-axis 4: Channel 4 (pink graphic line)

4.7.9 Alarm Trace Operation

Trigger Trace has Sampling Period, Y-Axis Scale Set, Channel, Trigger Source Data, Trigger Edge, Trigger Position and Trigger Level as the initial settings.

Operate according to the sequence in the following <Figure 70>.

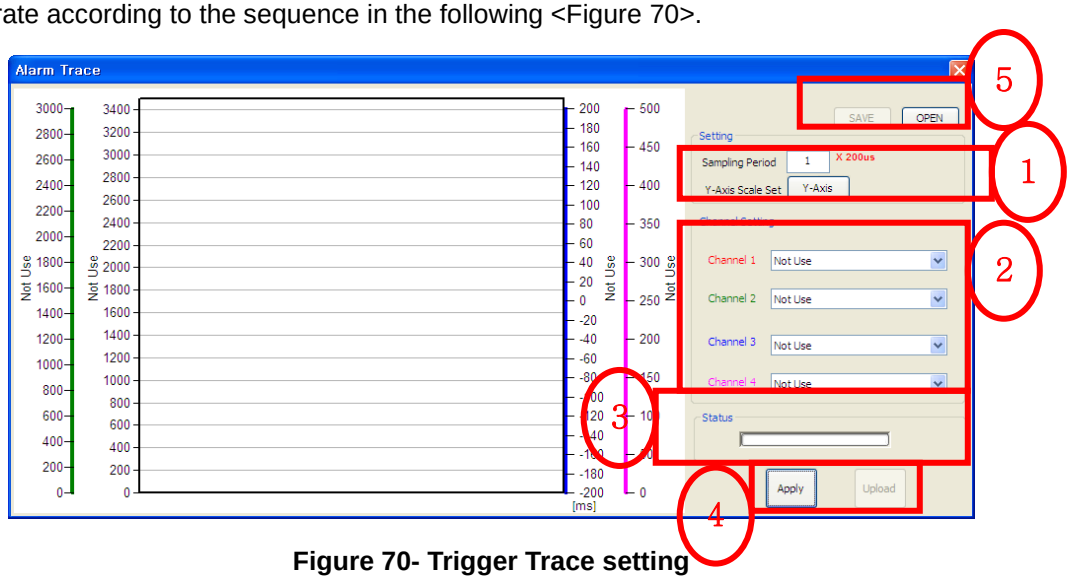


Figure 70- Trigger Trace setting

1. Enter Sampling Period in ① of the above <Figure 70>.
2. Click [Y-Axis] button in ① of the above <Figure 70> to adjust the Y-axis scale.
3. Set the channels in ② of the above <Figure 70>.
4. Click [Apply] button in ④ of the above <Figure 70> to save the settings of Paragraphs 1 and 3 in APD-L7N Servo Drive, which then makes preparation for operation. The Start and Stop buttons are activated.
5. The ③ in the above <Figure 67> animates the progress until an Alarm occurs in APD-L7N Servo Drive after the process in 4 is completed.
6. When the animation stops, an alarm occurs, and the data is collected, a message appears as shown in <Figure 71> and [Upload] button is activated.

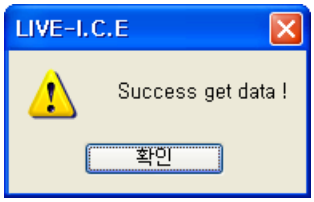


Figure 71- Message: Alarm data collection completed

7. Click [Upload] button in ④ of the above <Figure 70> to display the Graph data.

The following <Figure 72> shows the screen you will see when you finish the above process properly.

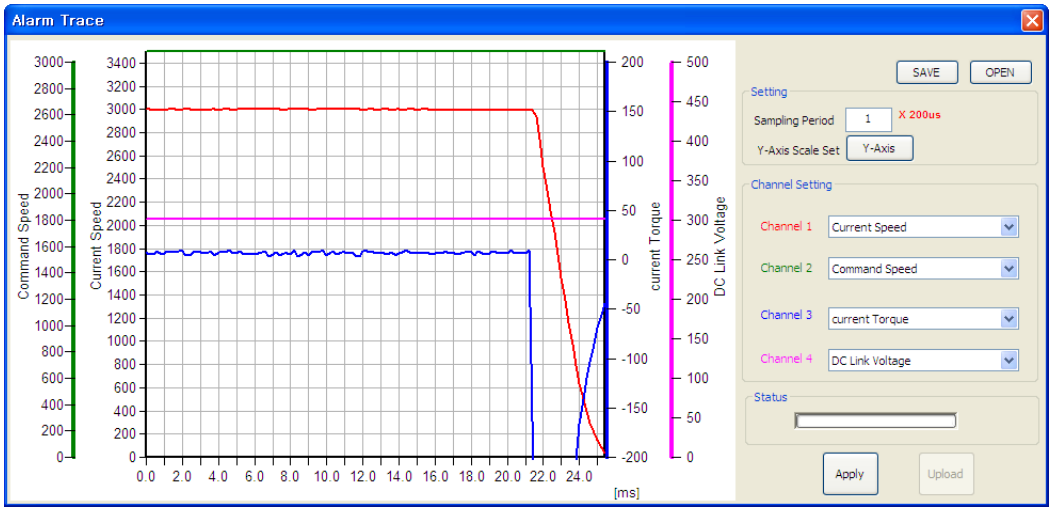


Figure 72- Alarm Trace operation screen

4.7.10 Alarm Trace File Saving and Opening

The Graph function of 'LIVE-I.C.E.' provides file saving and opening.

1. Click Save button in ⑤ of the above <Figure 70> to see the following screen.

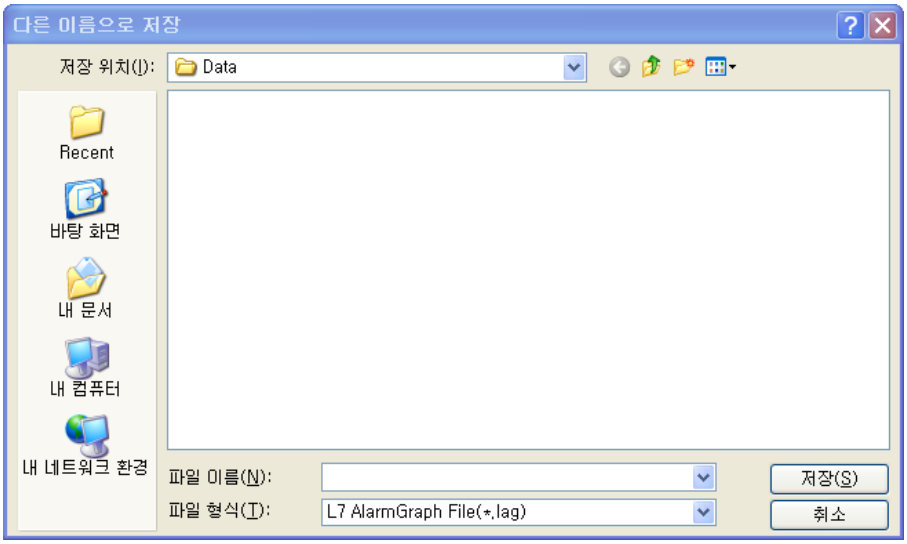


Figure 73- Alarm Trace saving: File dialogue window

In the above <Figure 73>, set the location and name the file, and then click 'Save' button to save the file in the 'lag' format.

2. Click Open button in ⑤ of the above <Figure 70> to see the following screen.

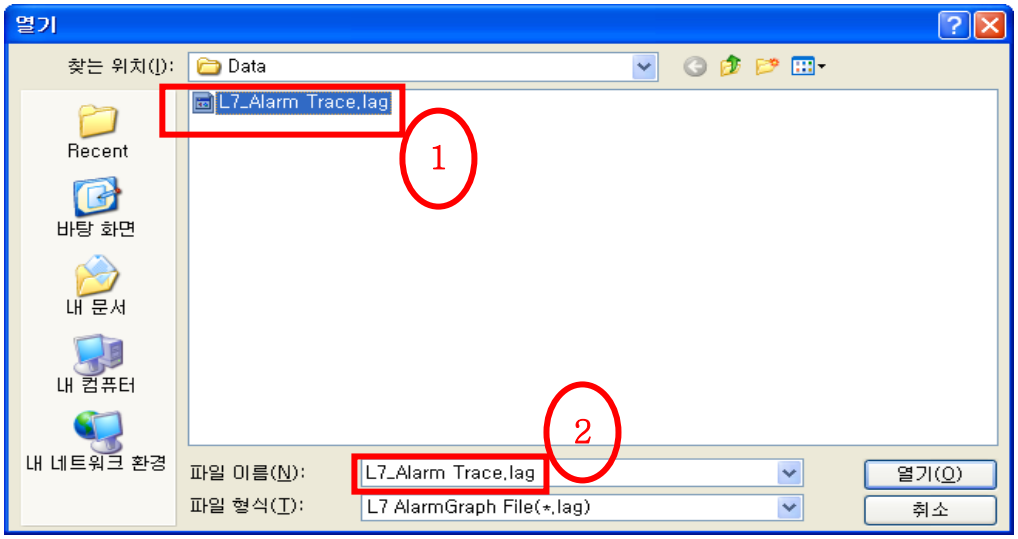


Figure 74- Trigger Trace opening: File dialogue window

As in ① and ② in the above <Figure 74>, select a 'lag' file and click 'Open' button. Then the Graph data are displayed from the selected file.

⚠ Caution
When saving the Graph data for Data Trace, Trigger Trace and Alarm Trace, the names of the files are different. Therefore in order to open a saved file, run a dialogue window suitable for the saved Graph data file and open the file.

4.8 Alarm History

The Alarm History function of 'LIVE - I.C.E.' shows the latest 20 pieces of Alarm History data that occurred in APD-L7N Servo Drive.

You can clear the Alarm History data.

4.8.1 Alarm History Start

Start the Gain Auto Tuning function of 'LIVE - I.C.E.' as in the following.

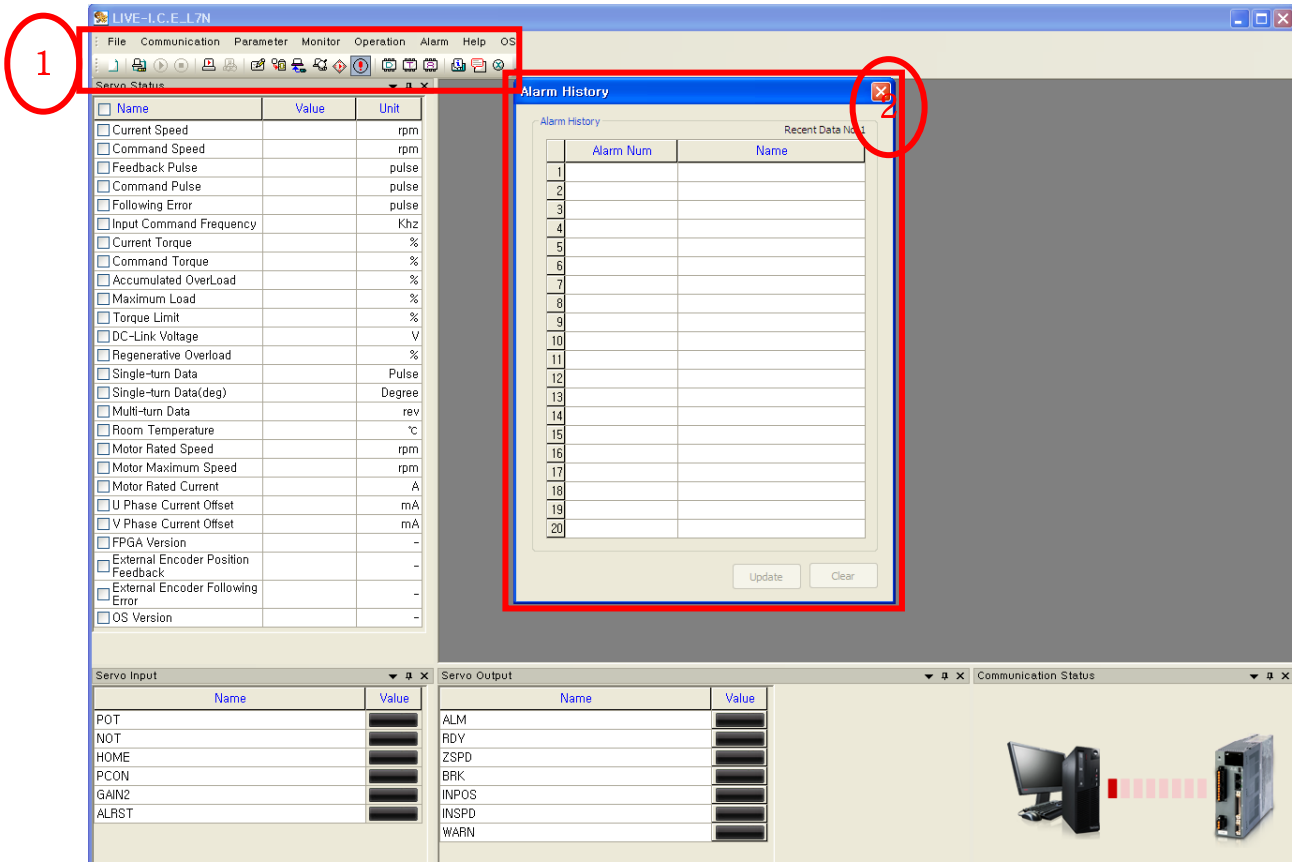


Figure 75- Alarm History screen

1. In ① of <Figure 75>, select Alarm -> Alarm History or click icon to activate Alarm History dialogue window as shown in ②.

4.8.2 Alarm History Operation

The Alarm History of 'LIVE - I.C.E.' brings the data from APD-L7N Servo Drive just by clicking Upload button without any special setting.

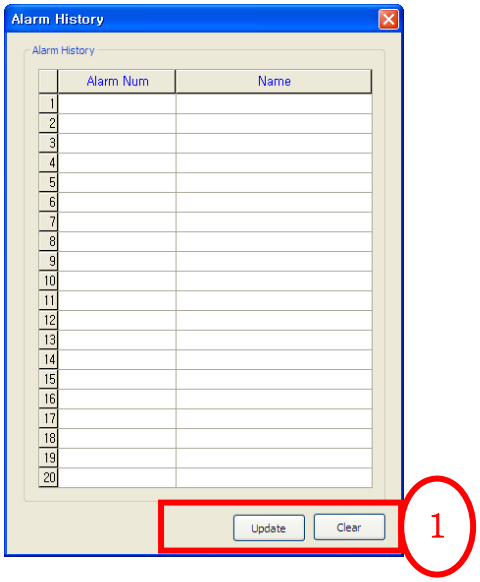


Figure 76- Gain Auto Tuning operation screen

1. Click  button in ① in the above <Figure 76> to activate the Clear button.

2. When the process in above 1 is completed, a message appears to report that Alarm History data has been received.

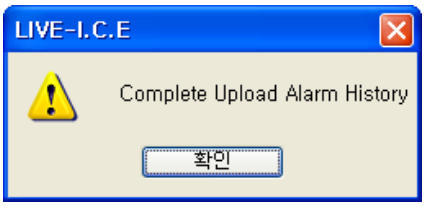


Figure 77- Message: Alarm History reception completed

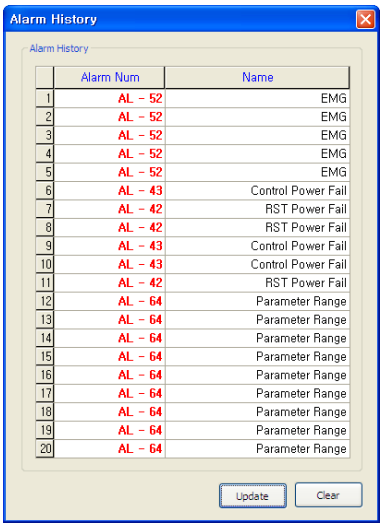


Figure 78- Alarm History completed screen

3. Click  button in ① of the above <Figure 76> to delete the uploaded data as shown in the above <Figure 76> and all Alarm History data saved in APD-L7N Servo Drive.

4.9 Alarm Reset

The Alarm Reset function of 'LIVE - I.C.E.' is used to reset after an alarm occurs in APD-L7N Servo Drive.

4.9.1 Alarm Reset Start

Start the Gain Auto Tuning function of 'LIVE - I.C.E.' as in the following.

Figure 79- Icon toolbar

1. Click  in the above <Figure 79> or select Alarm->Alarm Reset.

Figure 80- Message box: Alarm Reset failure

2. If Alarm Reset fails, a message appears as shown in the above <Figure 80>.

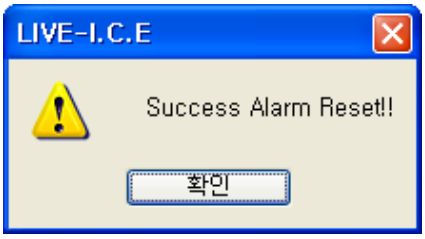


Figure 81- Message box: Alarm Reset Success

3. If Alarm Reset completes successfully, a message appears as shown in the above <Figure 81>.

5. OS Download

The LIVE-I.C.E professional version provides OS Download functions additionally.

5.1.1 OS download Start

Start the OS download function of 'LIVE - I.C.E.' as in the following.

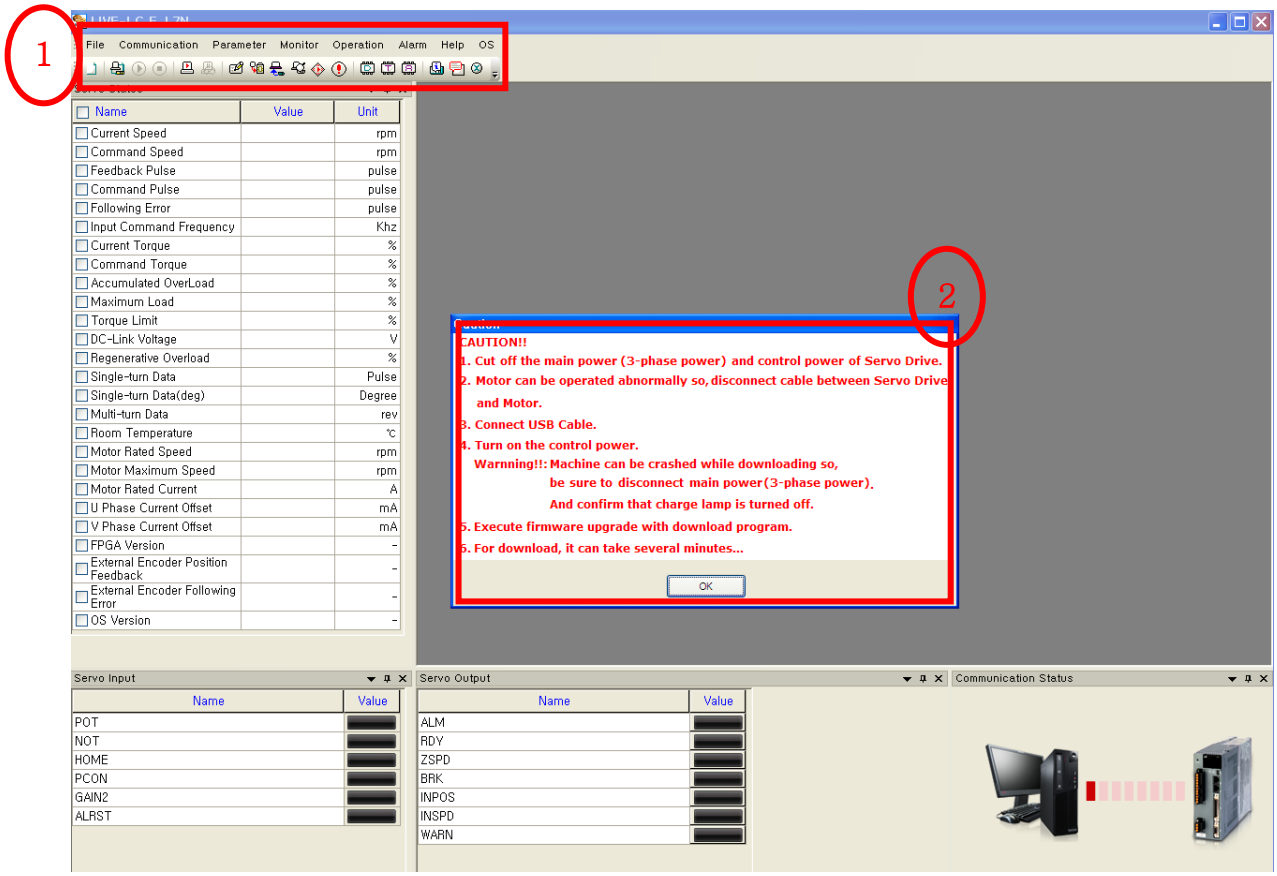


Figure 82- OS upgrade home screen

1. In ① of the above <Figure 82>, select OS -> OS Upgrade. The caution message window as shown in ② appears.

2. Click OK button to activate the OS download dialogue window as shown in <Figure 83>.

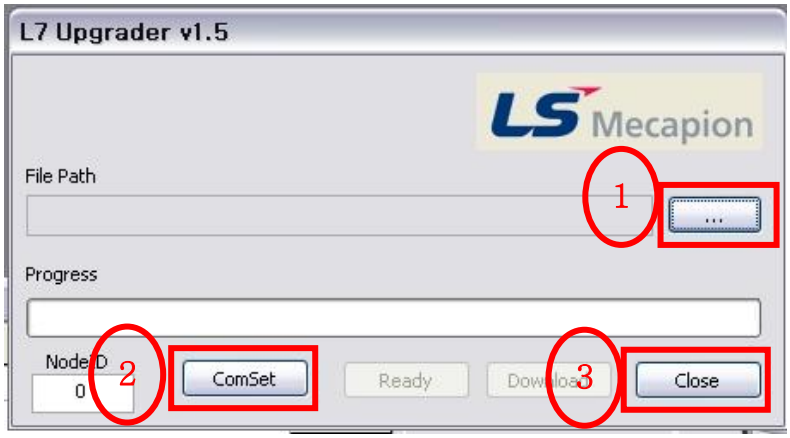


Figure 83- L7N Upgrader screen

3. Click ① in <Figure 83> to open a selection window as shown in the following <Figure 84>.

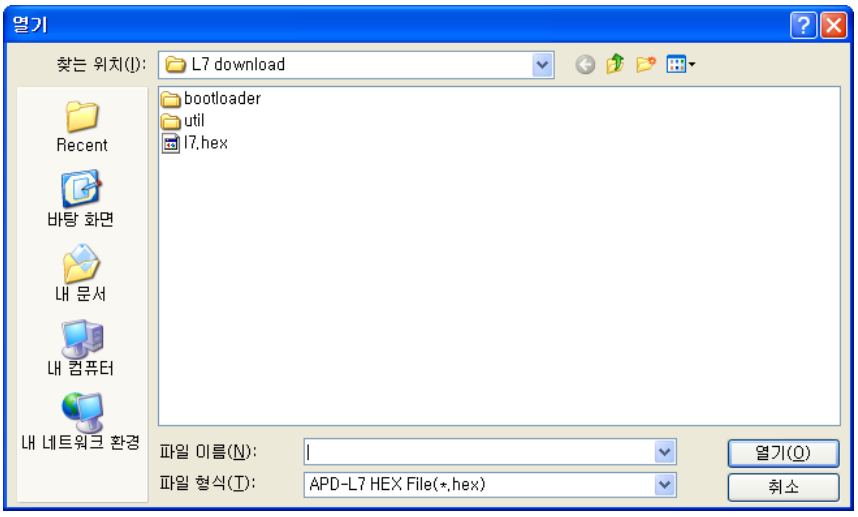


Figure 84- File selection dialogue window

4. If you complete file selection, a file path appears as shown in <Figure 85>.

5. Click ① button in the following <Figure 85> to reset the communication setting. **(It needs reconnection as it is an independent program. Close the connection with LIVE-I.C.E.)**

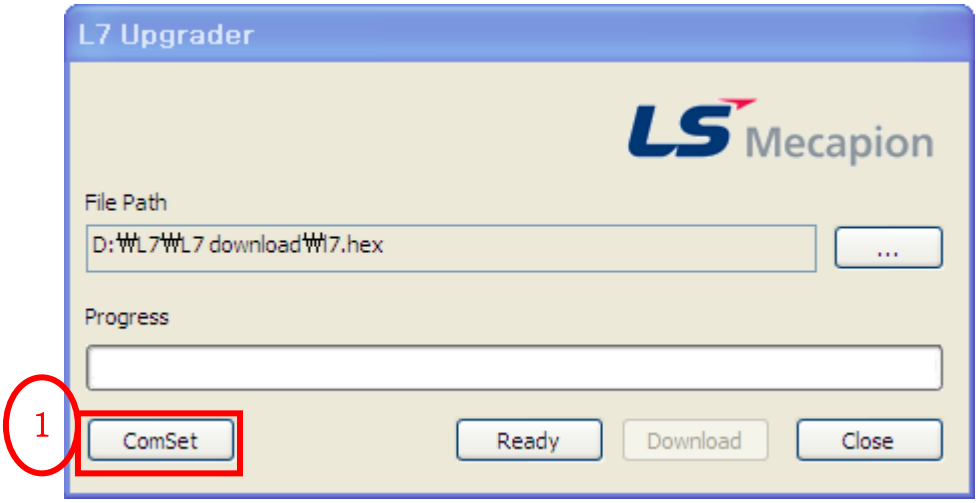


Figure 85- File path inserted screen

6. Click ① button in the above <Figure 85> to activate connecting communication.

7. When the communication setting is completed in 6, click ① button in the following <Figure 86> to activate the Download button.

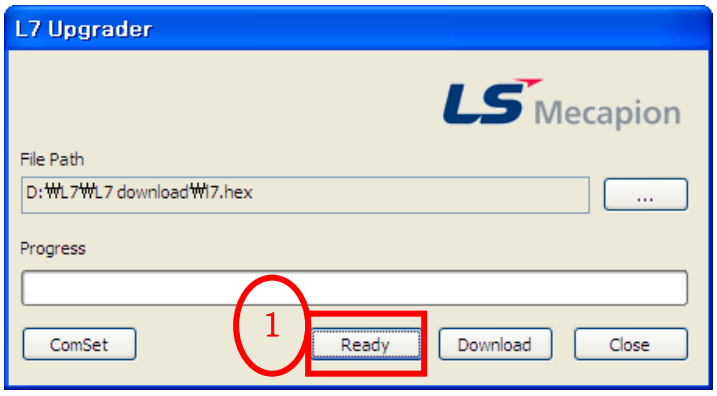


Figure 86- Download button activated screen

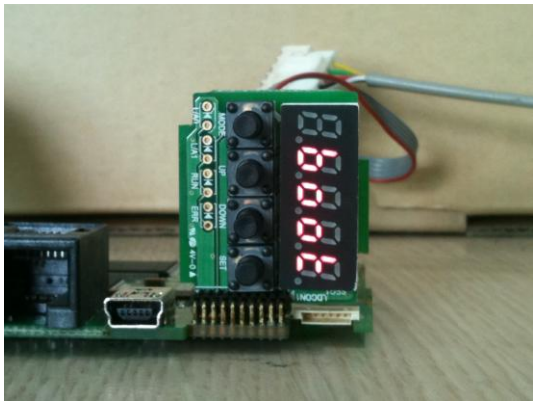


Figure 87- Ready-state Loader display

As shown in the above <Figure 87>, the Loader displays Boot, ready to download.

8. When the download starts, the progress bar operates as shown in the following <Figure 88>.

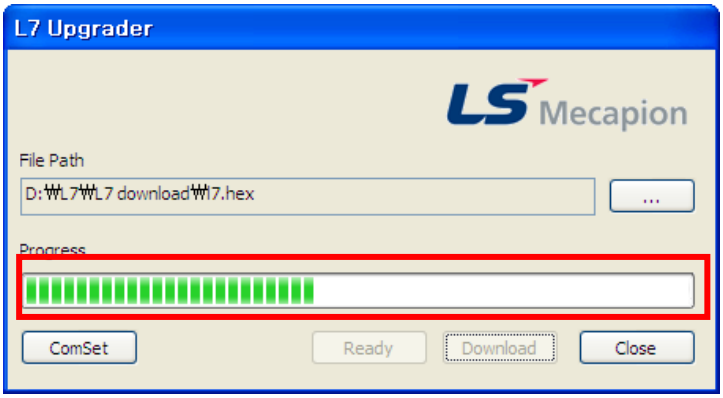


Figure 88 - Downloading screen

9. When the download is completed, the completion message appears as shown in the <figure 89>.

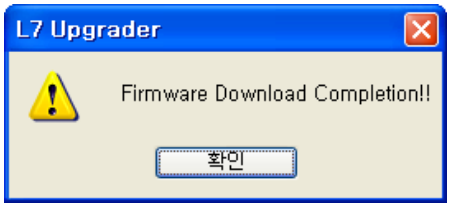


Figure 89 - Completion message window

Figure 90 - Completion-state Loader display

When completed, the Loader displays AL-31 as shown in the above <Figure 90>.

** If Loader displays Eboot, power on and off, and click Ready button again.

⚠ Caution
Since the OS Download program is working independently of LIVE-I.C.E, you must close the communication connection with LIVE-I.C.E. before starting download. When the download is completed, close the OS download program and connect with LIVE-I.C.E again.

6. Notch Filter

FFT Conversion function is available in Trigger Trace. (LIVE-I.C.E)
If FFT Conversion is done by using Trigger Monitor function in LIVE-ICE and collecting speed Feedback data, it is possible to detect a vibration frequency in normal state. Furthermore, The vibration in normal state will be reduced by applying the vibration frequency to Notch Filter.

6.1.1 Start FFT Conversion

Using Trigger Trace in LIVE - I.C.E.

** The Condition of activating FFT button

1) [0x210B] Speed feedback filter time constant : 0 2) [0x210C] Torque command filter time constant : 0.

(This part needs a manual conversion.)

Trigger Trace Button will be activated when it meets the active condition of FFT Button above.

Example)

Test(500±50 RPM) with Sin

Sampling Period : 200us Trigger Source Data : Current Speed

Trigger Edge : 0 Trigger Level : 500

Channel 1 : Current Speed

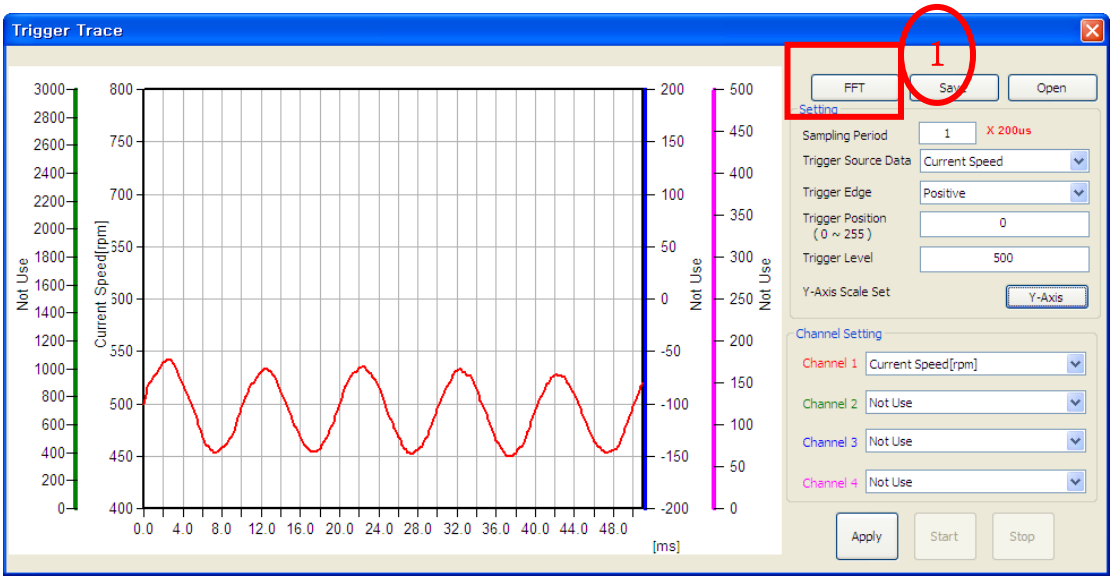


Figure 91- Display of Trigger detection

1. Display wave of 500±50 RPM by Trigger Trace like <figure 91> above and then ① FFT button will be activated.
2. FFT Conversion graph as <figure 92> will be displayed when clicking FFT button.
3. Apply value of frequency to Notch Filter Parameter manually.

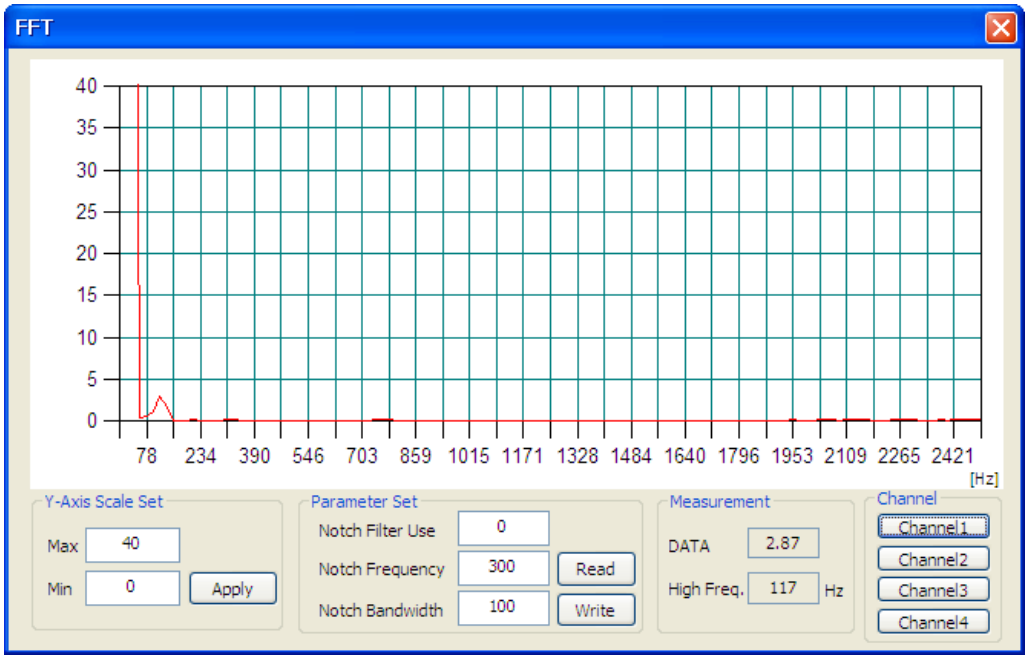


Figure 92-Display of FFT Conversion

7. Technical support

The contact information for questioning and assistance in using ‘LIVE-I.C.E.’ is as follows:

- Home page: http://lsmecapion.com
- Phone: 82-53-593-9186
- FAX: 82-53-591-9186
- 82-53-593-0069 (LS Mecapion Research Institute)

Quality Assurance

Product Name	LIVE - I.C.E		Date of Installation	
Model Name			Warranty Period	
Customer	Name			
	Address			
	Phone			
Retailer	Name			
	Address			
	Phone			

This product was produced under strict quality control and test procedures of LS Mecapion technicians. Its term of warranty is 12 months after the date of installation. If no date of installation is written, the warranty is valid for 18 months after the date of manufacture. However, this term of warranty may change depending on contract terms.

Free Technical Support

If the drive malfunctions while properly used and the product warranty has not expired, contact one of our agencies or designated service centers. We will repair the drive free of charge.

Paid Technical Support

Technical support is not free if:

- **Malfunction was caused by the intentional or unintentional negligence of the consumer.**
- **Malfunction was caused by inappropriate voltage or defects of machines connected to the product.**
- **Malfunction was caused by Act of God (fire, flood, gas, earthquake, etc.).**
- **The product was modified or repaired in a place that is not our agency or service center.**
- **The LS Mecapion name tag is not attached to the product.**
- **The warranty has expired.**

※ Please fill out this quality assurance form after installing the servo and send the form to our quality assurance department (the person in charge of technical support).

Send to: LS Mecapion Quality Assurance Service
Phone: 053) 593-0066 (154) Fax: 053) 591-8614

Visit the LS Mecapion homepage (***http://www. lsmecapion.com)*** for useful information and services.

User Manual Revision History

Number	Issued Year and Month	Revised Content	Version Number	Notes