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LIVE – I.C.E._L7N

Professional Version 1.1

User Manual 1.1



- 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.





iii

Table of Contents

Table	e of C	ontents	iii
1.	. Descriptions on the Manual		
	1.1	Functions a	and Objectives of 'LIVE - I.C.E. Manual'
	1.2	Description	ns of Marks in 'LIVE - I.C.E. Manual'1-1
	1.3	Compositio	on of 'LIVE - I.C.E. Manual'1-1
2.	Insta	llation of '	'LIVE - I.C.E.'
	2.1	Installation	Requirements of 'LIVE - I.C.E.'
	2.2	Installation	of 'LIVE - I.C.E.'
		2.2.1 In	nstallation of the PC Application
		2.2.2 In	nstallation of USB Device Driver
3.	Com	position o	of 'LIVE - I.C.E.'
	3.1	Compositio	on for USB Monitoring Function 3-1
		3.1.1 M	lain dialoque window
		3.1.2 C	Communication Dialogue Window
		3.1.3 'F	Parameter Editing' Dialogue Window
		3.1.4 G	Sraph Setting Dialogue Window
		3.1.5 G	Braph Dialogue Window
		3.1.6 M	Ianual JOG Dialogue Window
		3.1.7 A	uto Gain Tuning Dialogue Window
		3.1.8 A	larm History Dialogue Window3-9
4.	Fund	tions of 'L	_IVE - I.C.E.'
	4.1	USB conne	ection and communication connection4-2
	4.1	USB conne 4.1.1 M	ection and communication connection
	4.1	USB conne 4.1.1 M 4.1.2 C	ection and communication connection
	4.1 4.2	USB conne 4.1.1 M 4.1.2 C Monitoring	ection and communication connection
	4.1 4.2	USB conne 4.1.1 M 4.1.2 C Monitoring 4.2.1 M	A-2 Nake the USB connection after APD-L7N Servo Drive is booted. Communication connection and termination after USB connection 4-3 function 4-4 Nonitoring Start and Termination
	4.1 4.2	USB conne 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M	A-2 Nake the USB connection after APD-L7N Servo Drive is booted. Communication connection and termination after USB connection 4-3 function. 4-4 Nonitoring Start and Termination 4-6
	4.1 4.2	USB conne 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M	A-2 Nake the USB connection after APD-L7N Servo Drive is booted. Communication connection and termination after USB connection 4-3 function 4-4 Nonitoring Start and Termination 4-6 Nonitoring Stop
	4.1 4.2	USB conne 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.4 A	action and communication connection 4-2 Nake the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function 4-4 Nonitoring Start and Termination 4-4 Ionitoring Data 4-6 Nonitoring Stop 4-7 Note on using the monitoring function 4-8
	4.1 4.2 4.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.4 A Parameter	Action and communication connection 4-2 Nake the USB connection after APD-L7N Servo Drive is booted. 4-2 Communication connection and termination after USB connection 4-3 function. 4-4 Nonitoring Start and Termination. 4-4 Nonitoring Data. 4-6 Nonitoring Stop 4-7 Inote on using the monitoring function 4-8 Editing 4-9
	4.1 4.2 4.3	USB conne 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P	Action and communication connection 4-2 Nake the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function 4-4 Nonitoring Start and Termination 4-4 Nonitoring Data 4-6 Nonitoring Stop 4-7 Induction 4-8 Editing 4-9 Parameter Read/Write Start 4-9
	4.1 4.2 4.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R	Action and communication connection 4-2 Make the USB connection after APD-L7N Servo Drive is booted. 4-2 Communication connection and termination after USB connection 4-3 function. 4-4 Monitoring Start and Termination 4-4 Nonitoring Data. 4-6 Nonitoring Stop 4-7 Inditoring Stop 4-9 Inditoring Stop 4-9 Inditional Indition 4-9 Inditional Indition 4-9 Inditional Indition 4-9 Inditional Indition 4-9 Inditional Inditindition 4-9 Indi
	4.1 4.2 4.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.3 R	ection and communication connection 4-2 Make the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function 4-4 Monitoring Start and Termination 4-4 Monitoring Data 4-6 Monitoring Stop 4-7 In onte on using the monitoring function 4-8 Editing 4-9 Parameter Read/Write Start 4-9 Read All Parameters 4-11 tead Parameters 4-12
	4.1 4.2 4.3	USB conne 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.3 R 4.3.4 P	action and communication connection 4-2 Make the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function. 4-4 Nonitoring Start and Termination 4-4 Nonitoring Data. 4-6 Nonitoring Stop 4-7 In onte on using the monitoring function 4-8 Editing 4-9 rarameter Read/Write Start 4-9 tead All Parameters 4-11 rarameter Data Change 4-13
	4.1 4.2 4.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.2 R 4.3.3 R 4.3.4 P 4.3.5 W	Action and communication connection 4-2 Make the USB connection after APD-L7N Servo Drive is booted. 4-2 Communication connection and termination after USB connection 4-3 function. 4-4 Monitoring Start and Termination 4-4 Monitoring Data. 4-6 Monitoring Stop 4-7 In note on using the monitoring function 4-8 Editing 4-9 Varameter Read/Write Start 4-9 Vite All Parameters 4-12 Vrite All Parameters 4-13 Vrite All Parameters 4-14
	4.1 4.2 4.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.3 R 4.3.4 P 4.3.5 W 4.3.6 W	Action and communication connection 4-2 Nake the USB connection after APD-L7N Servo Drive is booted. 4-2 Communication connection and termination after USB connection 4-3 function 4-4 Nonitoring Start and Termination 4-4 Nonitoring Data 4-6 Nonitoring Stop 4-7 In note on using the monitoring function 4-8 Editing 4-9 Parameter Read/Write Start 4-9 Read All Parameters 4-11 Parameter Data Change 4-13 Write All Parameters 4-14 Write Parameters 4-15
	4.1 4.2 4.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.3 R 4.3.3 R 4.3.4 P 4.3.5 W 4.3.6 W	action and communication connection 4-2 Make the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function 4-4 Monitoring Start and Termination 4-4 Monitoring Data. 4-6 Monitoring Stop 4-7 In onte on using the monitoring function 4-8 Editing 4-9 Parameter Read/Write Start 4-9 tead All Parameters 4-11 tead Parameter Data Change 4-13 Write Parameters 4-14 Write Parameters 4-15 Parameter Saving 4-18
	4.14.24.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.3 R 4.3.3 R 4.3.4 P 4.3.5 M 4.3.6 M 4.3.6 M	ection and communication connection 4-2 Make the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function 4-4 Monitoring Start and Termination 4-4 Monitoring Data. 4-6 Monitoring Stop 4-7 In onte on using the monitoring function 4-8 Editing 4-9 Parameter Read/Write Start 4-9 Read All Parameters 4-11 Read Parameters 4-12 Arrameter Data Change 4-13 Write All Parameters 4-14 Write Parameter Saving 4-18 Parameter Opening. 4-18
	4.14.24.3	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.3 R 4.3.3 R 4.3.3 R 4.3.4 P 4.3.5 W 4.3.5 W 4.3.6 W 4.3.7 P 4.3.8 P	ection and communication connection 4-2 Make the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function 4-4 donitoring Start and Termination 4-4 donitoring Data 4-6 donitoring Stop 4-7 note on using the monitoring function 4-8 Editing 4-9 earameter Read/Write Start 4-9 tead All Parameters 4-12 arameter Data Change 4-13 Vrite All Parameters 4-14 Vrite Parameter Saving 4-18 arameter Opening 4-18 arameter Opening 4-18
	4.14.24.34.4	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.2 R 4.3.3 R 4.3.3 R 4.3.4 P 4.3.5 M 4.3.5 M 4.3.6 M 4.3.7 P 4.3.8 P 4.3.8 P 4.3.9 N	ection and communication connection4-2Make the USB connection after APD-L7N Servo Drive is booted.4-2communication connection and termination after USB connection4-3function.4-4Monitoring Start and Termination4-4Monitoring Data.4-6Monitoring Stop4-7In ote on using the monitoring function4-8Editing4-9Read All Parameters4-11Market Patameters4-12Marameter Data Change4-13Vrite All Parameters4-15arameter Saving4-18Iotes for Using Parameter Editing4-20G
	4.14.24.34.4	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.2 R 4.3.3 R 4.3.3 R 4.3.4 P 4.3.5 M 4.3.6 M 4.3.6 M 4.3.7 P 4.3.8 P 4.3.8 P 4.3.9 N Manual JOU 4.4.1 M	ection and communication connection4-2lake the USB connection after APD-L7N Servo Drive is booted.4-2communication connection and termination after USB connection4-3function4-4Innitoring Start and Termination4-4Ionitoring Data.4-6Ionitoring Stop4-7In ote on using the monitoring function4-8Editing4-9arameter Read/Write Start4-9tead All Parameters4-11tead Parameters4-12arameter Data Change4-13Vrite All Parameters4-15arameter Saving4-18totes for Using Parameter Editing4-20G.4-20G.4-21
	4.14.24.34.4	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.3 R 4.3.3 R 4.3.3 R 4.3.4 P 4.3.5 W 4.3.5 W 4.3.6 W 4.3.7 P 4.3.8 P 4.3.8 P 4.3.9 N Manual JOP 4.4.1 M	ection and communication connection 4-2 lake the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function. 4-4 donitoring Start and Termination 4-4 donitoring Data. 4-6 donitoring Stop 4-7 note on using the monitoring function 4-8 Editing 4-9 arameter Read/Write Start 4-9 tead All Parameters 4-11 tead Parameters 4-12 arameter Data Change 4-18 vite All Parameters 4-18 arameter Opening 4-18 lotes for Using Parameter Editing 4-20 G 4-21 fanual JOG Start 4-21 fanual JOG Operation 4-22
	4.14.24.34.4	USB conner 4.1.1 M 4.1.2 C Monitoring 4.2.1 M 4.2.2 M 4.2.3 M 4.2.4 A Parameter 4.3.1 P 4.3.2 R 4.3.2 R 4.3.3 R 4.3.3 R 4.3.4 P 4.3.5 M 4.3.5 M 4.3.6 M 4.3.7 P 4.3.8 P 4.3.8 P 4.3.9 N Manual JOC 4.4.1 M 4.4.2 M	ection and communication connection 4-2 flake the USB connection after APD-L7N Servo Drive is booted. 4-2 communication connection and termination after USB connection 4-3 function 4-4 fonitoring Start and Termination 4-4 fonitoring Data 4-6 fonitoring Stop 4-7 note on using the monitoring function 4-8 Editing 4-9 arameter Read/Write Start 4-9 tead All Parameters 4-11 tead Parameters 4-13 vrite All Parameters 4-15 arameter Data Change 4-18 otes for Using Parameter Editing 4-20 G 4-21 fanual JOG Start 4-20 Iow to handle when the SVON contact is on after terminating the Manual Jog. 4-23



	4.5 Program JOG		JOG 4-	·24
		4.5.1	Program JOG Start 4-	·24
		4.5.2	Program JOG Operation 4-	·25
		4.5.3	How to handle when the SVON contact is on after terminating the Program Jog. 4-	·26
	4.6	Gain Aut	o Tuning 4-	·26
		4.6.1	Gain Auto Tuning Start 4-	·26
		4.6.2	Gain Auto Tuning Operation	·27
	4.7	Graph O	utput	·29
		4.7.1	Graph Channel Table 4-	·29
		4.7.2	DataTrace Start	-30
		4.7.3	DataTrace Operation 4-	·31
		4.7.4	DataTrace File Saving and Opening 4-	-32
		4.7.5	Trigger Trace Start 4-	.33
		4.7.6	Trigger Trace Operation 4-	-34
		4.7.7	Trigger Trace File Saving and Opening 4-	-35
		4.7.8	Alarm Trace Start 4-	-36
		4.7.9	Alarm Trace Operation 4-	-37
		4.7.10	Alarm Trace File Saving and Opening4-	.39
	4.8	Alarm Hi	story 4-	-40
		4.8.1	Alarm History Start 4-	-40
		4.8.2	Alarm History Operation	-41
	4.9	Alarm Re	eset	-43
		4.9.1	Alarm Reset Start 4-	-43
5.	OS D	ownloa	d5	5-1
		5.1.1	OS download Start	5-1
6.	Notcl	h Filter.	5	j-1
		6.1.1	Start FFT Conversion	5-1
7.	Tech	nical su	pport5	j-1
Quali	ity Ass	surance		5-3
11	Marrie	-	ien llietem.	- 4
user	User Manual Revision History5-4			

List of Figures

Figure 1 - Installation of PC application: Start 'LIVE - I.C.E.' Setup Wizard	2-2
Figure 2 - Installation of PC application: Select Installation Folder	2-3
Figure 3 - Installation of PC application: Start installation	2-4
Figure 4 - Installation of PC application: Installation complete	2-5
Figure 5 - Installation of PC application: Run	2-5
Figure 6 - Installation of USB device driver: Start InstallShield Wizard for PL-2303	2-6
Figure 7 - Installation of USB device driver: Install PL-2303 components	2-6
Figure 8 - Installation of USB device driver: Finish PL-2303 components installation	2-7
Figure 9 - Installation of USB device driver: Connect the cable	2-7
Figure 10 - Installation of USB device driver: Check the installation	2-8
Figure 11 - 'LIVE - I.C.E.': Main dialogue window	3-1
Figure 12 - 'LIVE - I.C.E.': Main menu bar and icon bar	3-1
Figure 13 - 'LIVE - I.C.E.': Status Bar	3-2
Figure 14 - 'Communication Setting' dialogue window	3-3
Figure 15 - 'Parameter Editing' dialogue window	3-4
Figure 16 - Graph setting dialogue window	3-5

Figure 17 - Graph dialogue window	3-6
Figure 18 - Manual JOG dialogue window	3-7
Figure 19 - Auto gain tuning dialogue window	3-8
Figure 20 - Alarm history dialogue window	3-9
Figure 21 - Communication connection	4-3
Figure 22 - Communication setting	4-3
Figure 23 - Communication start	4-4
Figure 24 - In monitoring	4-5
Figure 25 - Monitoring stop	4-8
Figure 26 - Parameter Reading message	4-9
Figure 27 - 'Parameter Editing' screen	4-10
Figure 28 –Read All Parameters	4-11
Figure 29 - Message box: Read All Parameters success	4-11
Figure 30 - Read Parameters	4-12
Figure 31 - Message box: Read Parameters success	4-12
Figure 32 - POP dialogue window: Select Help window	4-13
Figure 33 - Write All Parameters	4-14
Figure 34 - Message box: Write All Parameters completed	4-14
Figure 35 - Message box: Turn off SVON	4-15
Figure 36 - Write Parameters	
Figure 37 - Message box: Write Parameters completed	4-16
Figure 38 - Message box: Write Fataliteters completed	
Figure 30 - Message box: Parameter Pange Error	
Figure 30 Message box: Fatameter Range Error	
Figure 40 - Message Dox. Soliware Reset	
Figure 41 - Falameter Saving	
Figure 42- Farameter saving. File dialogue window	
Figure 44- Parameter opening: Eile dialogue window	
Figure 44 - Farameter opening completed earoon	
Figure 46- Parameter opening completed screen	
Figure 46- Manual JOG screen	
Figure 47- Manual JOG operation screen	
Figure 48- Message: Confirm SVON ON/OFF	
Figure 49- Message: SVON contact warning window	
Figure 50- Manual JOG screen	
Figure 51- Program JOG operation screen	
Figure 52- Message: Confirm SVON ON/OFF	4-25
Figure 53- Gain Auto Tuning screen	4-26
Figure 54- Gain Auto Tuning operation screen	4-27
Figure 55- Message: Start confirmation window	4-27
Figure 56- In Gain Auto Tuning	4-27
Figure 57- Confirm Gain Auto Tuning stop	4-28
Figure 58- Gain Auto Tuning completed screen	4-28
Figure 59- DataTrace start screen	4-30
Figure 60- DataTrace setting	4-31
Figure 61- DataTrace operation screen	4-32
Figure 62- DataTrace saving: File dialogue window	4-32
Figure 63- DataTrace opening: File dialogue window	4-33
Figure 64- Trigger Trace start screen	4-33
Figure 65- Trigger Trace setting	4-34
Figure 66- Trigger Trace operation screen	4-35
Figure 67- Trigger Trace saving: File dialogue window	4-36
Figure 68- Trigger Trace opening: File dialogue window	4-36
Figure 69- Alarm Trace start screen	4-37
Figure 70- Trigger Trace setting	4-38
	LS Mecapion



Figure 71- Message: Alarm data collection completed	4-38
Figure 72- Alarm Trace operation screen	4-39
Figure 73- Alarm Trace saving: File dialogue window	4-39
Figure 74- Trigger Trace opening: File dialogue window	4-40
Figure 75- Alarm History screen	4-41
Figure 76- Gain Auto Tuning operation screen	4-42
Figure 77- Message: Alarm History reception completed	4-42
Figure 78- Alarm History completed screen	4-42
Figure 79- Icon toolbar	4-43
Figure 80- Message box: Alarm Reset failure	4-43
Figure 81- Message box: Alarm Reset Success	4-43
Figure 82- OS upgrade home screen	5-1
Figure 83- L7N Upgrader screen	5-2
Figure 84- File selection dialogue window	5-2
Figure 85- File path inserted screen	5-3
Figure 86- Download button activated screen	5-3
Figure 87- Ready-state Loader display	5-3
Figure 88 - Downloading screen	5-4
Figure 89 - Completion message window	5-4
Figure 90 - Completion-state Loader display	5-4
Figure 91- Display of Trigger detection	5-2
Figure 92-Display of FFT Conversion	5-2

List of Tables

Table 1 - Installation Requirements	
Table 2 - Descriptions of each part of the main dialogue window	3-2
Table 3 - Composition and details of Parameter Editing	3-4
Table 4 - Composition and details of Parameter Editing	3-6
Table 5 - Composition and details of Manual JOG	
Table 6 - Composition and details of Auto Gain Tuning	3-8
Table 7 - Composition and details of Alarm History	3-9
Table 8 – 'LIVE - I.C.E.' functions list	4-1
Table 9 - Monitored values list	4-6
Table 10 - Description of monitored parameter data	4-6
Table 11 - Description of the I/O contact data	4-7
Table 12 - Graph Channel Table	4-29
Table 13 - DataTrace Graph properties	4-30
Table 14 - Trigger Graph properties	4-34
Table 15 - Trigger Trace initial setting	4-34
Table 16 - Alarm Graph properties	4-37

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.).

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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

Next > to move to the next.



률 LIVE−I.C.E	
Select Installation Folder	
The installer will install LIVE-I.C.E to the following folder.	
To install in this folder, click "Next". To install to a different folder, enter it bel	ow or click "Browse".
Eolder: [C:₩Program Files₩LS Mecapion₩LIVE-I,C,E₩ [Install LIVE-I.C.E for yourself, or for anyone who uses this computer:	B <u>r</u> owse Disk Cost
 ● <u>E</u>veryone ○ Just <u>m</u>e 	
Cancel < <u>B</u> ack	<u>N</u> ext >

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>

🛃 LIVE-I.C.E			
Installing LIVE-I.C.E			
LIVE-I.C.E is being installed.			
Please wait			
	Cancel	< <u>B</u> ack	Next >

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 button to move to the next.

PL-2303 Driver Installer Program	×
Setup Status	
PL-2303 USB-to-Serial is configuring your new software installation.	
Installing	
C:\WINDOWS\system32\SER9PL.sys	
L - A MER Z LL	
Instalionielo	

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

PL-2303 Driver Installer Program		
	InstallShield Wizard Complete The InstallShield Wizard has successfully installed PL-2303 USB-to-Serial. Click Finish to exit the wizard.	
	< <u>B</u> ack Finish Cancel	

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.



2-7

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







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.'.

Section: LIVE-I.C.E_L7N_r1.0						
File Communication Parar	neter Monitor Operat	ion Ale	arm Help OS			
:] 🕑 💿 😐 🚇 📽	1 2 4 0 0 0 0) (I) (I)	u 🔁 🛛 🚪			
Servo Status		• • ×				
🗖 Name	Value Ur	nit				
Current Sneed		mm				
Command Speed		rpm				
Feedback Pulse		pulse				
Command Pulse		pulse				
Following Error		pulse				
Input Command Frequency		Khz				
Current Torque		%				
Command Torque		%				
Accumulated OverLoad		%				
Maximum Load		%				
🔲 Torque Limit		%				
DC-Link Voltage		V				
Regenerative Overload		%				
🔲 Single-turn Data		Pulse				
Single-turn Data(deg)	D	egree				
🔲 Multi-turn Data		rev				
Room Temperature		°C				
Motor Rated Speed		rpm				
Motor Maximum Speed		rpm				
Motor Rated Current		Α				
U Phase Current Offset		mΑ				
V Phase Current Offset		mΑ				
FPGA Version		-				
External Encoder Position Feedback		-				
Error		-				
US Version		-				
Servo Input		• 4 ×	Servo Output		 Communication Status	▼ # X
Name	Va	lue	Name	Value		
POT			ALM			
NOT			RDY			1
HOME			ZSPD			
PCON			BRK			
GAIN2			INPOS			
ALRST			INSPD			2/
			WARN			
Ready					CAF	NUM SCRL

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

1	File	Communication	Parameter	Monitor	Operation	Alarm	Help	os
		8 🕞 🗐 🖪	B 🖉 🕫 🕯	🕹 🖧 🚸	• 🖾 🖽) 🛱 (<u>1</u> 🔁	8 📮

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



Servo Status		★ ù X
🔲 Name	Value	Unit
Current Speed		rpm
Command Speed		rpm
Feedback Pulse		pulse
Command Pulse		pulse
Following Error		pulse
Input Command Frequency		Khz
Current Torque		%
Command Torque		%
Accumulated OverLoad		%
Maximum Load		%
Torque Limit		%
DC-Link Voltage		V
Regenerative Overload		%
🔲 Single-turn Data		Pulse
Single-turn Data(deg)		Degree
Multi-turn Data		rev
Room Temperature		*C
Motor Rated Speed		rpm
Motor Maximum Speed		rpm
Motor Rated Current		A
U Phase Current Offset		mA
V Phase Current Offset		mA
FPGA Version		-
External Encoder Position Feedback		-
External Encoder Following Error		-
OS Version		-
Servo Input		* 4 ×
Name		Value
POT		
NOT		
HOME		
PCON		
GAIN2		
ALRST		
Readu		

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 dialog
--

Figure	Name	Details		
Figure	Name Main menu bar	Details 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 a. Connect => Make the communication connection b. Connect => Make the communication connection c. Disconnect => Close the communication connection c. Disconnect => Close 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 • Stop => Stop the real-time monitoring • Stop => Stop the real-time monitoring • Data Trace => Graph the real-time monitoring • Data Trace => Operate the manual JOG • 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 i. User Manual => User's manual b. About LIVE-I.C.E.=> Version information 8. OS a. OS Downloader=> Provide the firmware downloader
17	Status Bar	 program 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 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.

Communication Setting					
Connection					
Node No.		0]		
Port	COM	5]		
Baud Rate	19200	*]		
ОК		Cance	1		



** 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.

P	Parameter Niling							
($\frac{1}{3}$		All Write Write	All Read		Read		EXIT 2
States System Control In/Out SpeedOperation PositionOperation FactorySetting Fullclosed								
	🗌 Object Num	SubIndex	Name	Value	Default	Unit	Minimum Value	Mamimum 🔽
	0×2600	-	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	-	-
	🔲 0×2604	-	Following Error	0	0	Pulse	-	-
	🔲 0×2605	-	Input Command Frequency	0	0,0	Khz	-	-
	🔲 0×2606	-	Current Torque	0	0,0	%	-	-
	🔲 0×2607	-	Command Torque	0	0,0	%	-	-
	🔲 0x2608	-	Accumulated Overload	0	0,0	%	-	-
	🔲 0×2609	-	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	-	-
	0×260E	-	Single-turn Data(deg)	1359	0,0	Degree	-	-
	🔲 0x260F	-	Multi-turn Data	0	0	rev	-	-
	🔲 0x2610	-	Room Temperature	36	0	°C	-	-
	🔲 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	mΑ	-	-
	🔲 0x2615	-	V Phase Current Offset	0	0	mΑ	-	-
	🔲 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
		All Write : Parameter All Write
2	Main Function Select Buttons	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.

Y-Axis Setting		
Y-Axis Setting	MAX	~ MIN
Monitor Channel 1	3500	0
Monitor Channel 2	3000	0
Monitor Channel 3	200	-200
Monitor Channel 4	500	0
Apply	Can	cel

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.

Trigger T	race 		
3000-	3400 -	200 500	Save Oper
2800-	3200 -	- 160 - 450 Samplin	g Period 1 X 200us
2600-	2800 -	- 140 Trigger	Source Data Current Speed
2400-	2600 -	- 120 - 400 Trigger	Edge Positive
2000-	2400	- 80 - 350 Trigger (0 ~	Position 0 255)
<u>ස</u> 1800-	2200 - <u> ^B</u> 2000 -	- 60 - 40 5 - 300 % Trigger	Level 0
⊃ ⊉ 1600-	호 1800	= 20	Scale Set Y-Axi
- 1400-	1600 -	20 2502- Channel	Setting
1200-	1400	40200 Channe	1 Not Use
1000-	1200 -	60 80 - 150 Change	a 2 Not Lice
800-	800	100	
600-	600	– -120 – 100 Channe – -140	. 3 Not Use
400-	400 -	160 - 30 Channe	4 Not Use
200-	200 -	180 4	

Figure 17 - Graph dialogue window

		5		
Number	Name	Details		
1	File Save /Read	Save : Graph Data File Save Open : Parameter data file Read		
2	Initial setting	 Trigger Monitor: Set Sampling Period, Trigger Source, Trigger Edge, Trigger Position and Trigger Level. 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		

Table 4 -	Composition	and details	of Parameter	Editing
-----------	-------------	-------------	--------------	---------

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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
0	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
٩	Command Function Select Buttons	Forward : Move in forward direction Reverse : Move in reverse direction
\$	Direction Buttons Lock/Unlock	LOCK STOP : state of Unlock. UNLOCK STOP : state of Lock(STOP is activated)

Auto Gain Tuning Dialogue Window 3.1.7

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

Tuning Speed: 1 (in 100RPM)

	G	ain Auto 1	uning			
	r)	uning Setting				
	/	Tuning Tar	get Distance	· ·	3	
\mathbf{C}		Tuning Spe	eed 🖵		8	
2	-0	Current Status	Ready for Tunin	ng	Start	
	7	tesult Ineria –				\equiv
		3 BEFOR	100	AFTER		
	9					

Figure 19 - Auto gain tuning dialogue window

Table 6 - Composition and details of Auto Gain Tuning						
Number	Name	Details				
1	Initial setting	 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				

Display the estimated inertia ratios before and after tuning

amposition and dotails of Auto Gain Tuning

Estimated inertia ratio

3



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

fable 7 - Compo	sition and	details of	f 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 – 'LI\	/E - I.C.E.'	functions list
----------------	--------------	----------------

Category	Function	Details	
	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.	
Monitoring function	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	
	Parameter setting	Read and write the parameters St-00 to P4-14	
	Manual JOG function	Manual JOG speed change and forward/reverse direction test	
Setting Function	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	
	Data Trace function	Display the graph for the pre-defined channel in real time	
Graph Function	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.

VE-I.C.E_L7N_r1.0						E
Et Communication Param	eter Monitor O	ineration Als	TTT Help OS			
	🕿 😼 🚸 🕕 🛛		20			
D Manual	Value	11-14				
	value	Unit				
Current Speed		rpm				
Command Speed		rpm				
Feedback Pulse		pulse				
Command Pulse		puise				
Following Error		puise				
Input Command Frequency		KNZ				
Current Torque		%				
Command Forque		76				
Accumulated OverLoad		%				
I Maximum Load		*				
J Torque Limit		%				
JUC-LINK Voltage		V				
Hegenerative Overload		70				
Single-turn Data		Pulse				
Single-turn Data(deg)		Degree				
Multi-turn Data		rev				
Hoom Temperature		rc				
Motor Hated Speed		rpm				
Motor Maximum Speed		rpm				
Motor Hated Current		A				
U Phase Current Offset		mA				
V Phase Current Offset		mA				
FPGA Version		-				
External Encoder Position		-				
External Encoder Following Error		-				
OS Version		-				
ervo Input		• # ×	Serve Output		 Communication Status	
Name		Value	Name	Value		
OT			PDV			
OME			7500			1000
CON						
AIN12			INPOS			
nine LBST			INSDD			
LE110 1			WARN		and the second sec	
			J			

Figure 21 - Communication connection

Communication Setting						
Connection —						
Node No.		0				
Port	COM	5				
Baud Rate	19200	~				
ОК		Cancel				

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.
- 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.
- 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, **Sector** is off, while **Sector** 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	Monitor and display the on/off of the input contacts of POT, NOT, HOME, PCON, GAIN2, ALRST.					
I/O contact	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>.

I/O contact name POT NOT HOME PCON Gain 2 ALRST ALARM	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					

Table 11 - Description of the I/O contact data

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>.

LIVE-I.C.E_L7N_r1.0							l
File Communication Decom	tor Monitor Or	and the At	an Hele Of				
: _) () () 🖪 📇 🛃 🖻 %	🖶 🖓 🚯 🛞 🚺	🗖 🗇 🛱 1	B, 🖓 ⊗ 💄				
Servo Status		▼ ₽ ×					
✓ Name	Value	Unit					
Current Speed	-1	rpm					
Command Speed	0	rpm					
Feedback Pulse	-23	pulse					
Command Pulse	-23	pulse					
Following Error	0	pulse					
Input Command Frequency	0,0	Khz					
Current Torque	0,0	%					
Command Torque	0,0	%					
Accumulated OverLoad	0,0	%					
🗹 Maximum Load	0,0	%					
🗹 Torque Limit	0,0	%					
☑ DC-Link Voltage	20,6	V					
Regenerative Overload	0,0	%					
🗹 Single-turn Data	197984	Pulse					
Single-turn Data(deg)	135,9	Degree					
Multi-turn Data	0	rev					
Room Temperature	52	°C					
Motor Rated Speed	3000	rpm					
Motor Maximum Speed	5000	rpm					
Motor Rated Current	2,89	A					
U Phase Current Offset	0	mA					
V Phase Current Offset	0	mA					
FPGA Version	3,2	-					
External Encoder Position Feedback	0	-					
Error	0	-					
OS Version	0,05	-					
Servo Input		★ û ×	Servo Output		★ û X	Communication Status	
Name		Value	Name	Value	Ĩ.		
POT			ALM				
NOT			RDY				
HOME			ZSPD				
PCON			BRK				
GAIN2			INPOS				
ALRST			INSPD			5	
			WARN				21/

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



tvo Status		→ û ×	Parameter Edit	ina							
Name	Value	Unit								1 /	1
Current Speed	-1	rpm								1 (
Command Speed	0	rpm			All Write	Nrite All Read	F	Read	EXIT	1 1	4
Feedback Pulse	-24	pulse									Ν.
Command Pulse	-24	pulse	Status System	Control In	Out SpeedOperation PositionOperation Fa	actorySetting Fullclosed					II.
Following Error	0	pulse	🗌 Object Num	SubIndex	Name	Value	Default	Unit	Minimum Manimu Malua		
Input Command Frequency	0,0	Khz	0×2603	-	Command F	Pulse -24	0	Pulse	-	T .	
Current Torque	0,0	%	0×2604	-	Following	Error 0	0	Pulse	- 3 1		
Command Torque	0,0	%	0×2605	-	Input Command Freque	ency O	0,0	Khz		-	
Accumulated OverLoad	0,0	%	0×2606	-	Current To	rque 0	0,0	%			
Maximum Load	0,0	%	0×2607	-	Command To	rque 0	0,0	%	\sim	1	
Torque Limit	0,0	%	0×2608	-	Accumulated Over	rload 0	0,0	%	-	-	
✓ DC-Link Voltage	20,5	V	0x2609	-	Maximum I	Load 0	0,0	%	-	-	
Regenerative Overload	0,0	%	0×260A	-	Torque	Limit 0	0,0	%	-	-	
Single-turn Data	197984	Pulse	0×260B	-	DC-Link Vo	Itage 204	0,0	V	-	-	
Single-turn Data(deg)	135,9	Degree	0×260C	-	Regenerative Over	rload 0,0	0,0	%	-	-	
V Multi-turn Data	0	rev	0x260D	-	Single-turn	Data 197984	0	Pulse	-		
Room Temperature	52	*C	0×260E	-	Single-turn Data(deg) 1359	0,0	Degree	-	-	
Motor Rated Speed	3000	rpm	0×260F	-	Multi-turn	Data 0	0	rev	-	-	
Motor Maximum Speed	5000	rpm	0×2610	-	Room Tempera	ature 52	0	°C	-		
Motor Rated Current	2,89	A	0×2611	-	Motor Rated S	peed 3000	0	rpm	-	-	
🗸 U Phase Current Offset	0	mA	0x2612	-	Motor Maximum S	peed 5000	0	rpm	-	-	
V Phase Current Offset	0	mA	0×2613	-	Motor Rated Cu	irrent 289	0,0	A	-	-	
FPGA Version	3,2	-	0×2614	-	U Phase Current C	Offset 0	0	mA	-	1	
External Encoder Position	n	_	0×2615	-	V Phase Current C	Offset 0	0	mA	-	-	
Feedback Evterpal Encoder Following			0x2616	-	FPGA Ver	rsion 32	0,0	-	-	-	
Error	0	-	0×2617	-	External Encoder Position Feed	back O	0	-	-	-	
OS Version	0,05	-	0×2618	-	External Encoder Following	Error 0	0	-	-		
										~	L
ervo Input		▲ ŭ ×	Servo Output			* 1	× Comr	nunication S	Status	• I X	1
Name		Value		Name	Value						
POT			ALM.								
VOT			BDY								
IOME			ZSPD								
CON			BBK							100	
GAIN2			INPOS								
ALRST			INSPD					-			
			111010					-	-		

Figure 27 - 'Parameter Editing' screen

- 1. In ① of <Figure 27>, select Parameter -> Parameter Editing or click 22 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.

arameter Edi	ting		\frown				
		All Write Write	1 All Read		Read		EXIT
Status System	Control In	/Out SpeedOperation PositionOperation EactoryS	etting Fullclosed			Minimum I	Mornirouro
Object Num	SubIndex	Name	Value	Default	Unit	Value	Value
0×2000	-	Motor ID	13	999	-	0	999
0x2001	-	Encode: Type	1	0	-	0	5
0×2002	-	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
0×2005	-	7SEG Display Object	0	0	-	0	65535
0×2006	-	Regenerative Resistor De-rating Factor	100	100	%	1	200
0×2007	-	Regenerative Resistor Value	0	0	ohm	0	1000
0×2008	-	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
0×200D	-	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	0×00	SubIndex0	9	9	-	0	65535
0x2014	0×01	DAC Output Mode	12816	12816	-	-32768	32767
0x2014	0×02	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.

All Read

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.

	Parameter Editing							
		Al Write	Write	ead 1	Read	P.Lock P.UnLock	EXIT	
2	Status System Contro	ol In/Out SpeedOperation PositionOperation Name	Value	Default	Unit	Minimum Value	Mamimum Value	
-		Matar ID	000	000	Onic	0	000	
V		Encoder Tune	333			0	555	
		Encoder Type Encoder Besolution	3000	DDr	DDr	1	30000	
		Operation Mode	1	1			5	
	PI-04	RS-422 BaudBate	0		bos	0	3	
	□ P(-05	Svstem ID	0	0		0	99	
	□ P(-06	Power Fail Mode	00	0600	-	0600	0611	
	 PI07	RST Check Time	20	20	ms	0	5000	
	PI-08	Start Up Parameter	0	0	-	0	26	
	P(-09	Regeneraion Derating	100	100	%	1	200	
	P(-10	Regeneration Brake Resistor	100	0	ohm	0	1000	
	PI-11	Regeneration Brake Capacity	50	0	W	0	30000	
	PI-12	Overload Check Base	100	100	%	10	100	
	PI-13	Overload Warning Level	50	50	%	10	100	
	🗖 P(-14	Encoder Out Numerator	1	1	-	1	16383	
	PI-15	Encoder Out Denominator	1	1	-	1	16383 —	
	PI-16	PWM OFF Delay	10	10	ms	0	1000	
	□ P(-17	DB Control Mode	0	0×0	-	0×0	0x3	
	PI-18	Function Select Bit	00	0Ь00	-	0Ь00	Ob11	
	P(-19	DAC Mode	3210	0x3210	-	0×0000	0xFFFF	
	PI-20	DAC Offset 1	0	0	Unit/V	-1000	1000	
	□ P(-21	DAC Offset 2	0	0	Unit/V	-1000	1000	
	J□PI-22	DAC Offset 3	0	0	Unit/V	-1000	1000 💌	

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).

Read

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.





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.

PowerFail Mode
Select bit Digit [1] : Phase 0 : Single Power Phase
Digit [2] : Error Process 0 : Error Process
00 Apply Cancel



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.

Parameter Edi	ting	\cap							
Statue System			ite	All Read		Read		EXIT	
Object Num	SubIndex	Name 2	Т	Value	Default	Unit	Minimum	Mamimum	•
0×2000	-	Moto	ID	13	999	-	<u>value</u> 0	<u>vaille</u> 999	
0×2001	-	Encoder T	De	1	0	-	0	5	
0×2002	-	Encoder Resolu	on	19	19	bit	0	21	
0x2003	-	Power Fail M	de	0	0	-	0	3	
0×2004	-	RST Power Fail Check Ti	ne	20	20	ms	0	5000	
0×2005	-	7SEG Display Ob	ect	0	0	-	0	65535	
🔲 0x2006	-	Regenerative Resistor De-rating Fa	tor	100	100	%	1	200	
0×2007	-	Regenerative Resistor Va	ue	0	0	ohm	0	1000	
🔲 0×2008	-	Regenerative Resistor Capa	ity	0	0	Watt	0	30000	
0×2009	-	Overload Check B	se	100	100	%	10	100	
0×200A	-	Overload Warning Le	vel	50	50	%	10	100	
0×200B	-	PWM OFF De	ay	10	10	ms	0	1000	
0×200C	-	Dynamic Brake Control Mi	de	0	0	-	0	3	
0×200D	-	Basic Function Configura	on	0	0	-	0	65535	
0×200E	-	Position Scale Numer	tor	1	1	-	-32768	32767	-
0×200F	-	Position Scale Denomin	tor	1	1	-	-32768	32767	
🗖 0x2010	-	Velocity Scale Numer	tor	1	1	-	-32768	32767	
0x2011	-	Velocity Scale Denomin	tor	1	1	-	-32768	32767	
0x2012	-	Acceleration Scale Numer	tor	1	1	-	-32768	32767	
0x2013	-	Acceleration Scale Denomin	tor	1	1	-	-32768	32767	
0×2014	0×00	SubInd	хO	9	9	-	0	65535	
0×2014	0×01	DAC Output M	de	12816	12816	-	-32768	32767	
0x2014	0×02	DAC Output Channel 1 Of	set	0	0	-	-32768	32767	~

Figure 33 - Write All Parameters

1. As ① in <Figure 33>, click

- 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.

				All Write Write	All Read] [lead		EXIT
S	Status	System	Control In	Out SpeedOperation PositionOperation Totclosed					
Y	<u>_</u> U	ject Num	SubIndex	Name 3	Value	Default	Unit	Minimum Value	Mamimum Value
	🗌 Ox <mark>e</mark>	102	-	Position P Gair 2	70	70	Hz	0	500
	🗌 Ox <mark>l</mark> a	103	-	Position Command Filter Time Constant	0	0	ms	0	1000
	_ 0x <mark></mark> 2	104	-	Position Feed-forward Gain	0	0	%	0	100
	🗌 Ox	105	-	Position Feed-forward Filter Time Constant	0	0	ms	0	1000
	🗌 0x 2	106	-	Speed P Gain 1	781	400	rad/s	0	5000
	🗌 Ox <mark>e</mark>	:107	-	Speed P Gain 2	700	700	rad/s	0	5000
E	🗹 🗸	108	-	Speed I Gain 1 Time Constant	13	50	ms	1	1000
	🗌 Ox <mark>e</mark>	109	-	Speed I Gain 2 Time Constant	15	15	ms	1	1000
	🗌 Ox <mark>e</mark>	:10A	-	Speed Command Filter Time Constant	0	0	ms	0	1000
	🗌 0× <mark>2</mark>	:10B	-	Speed Feedback Filter Time Constant	5	5	0, 1ms	0	1000
	🗌 Ox <mark>e</mark>	10C	-	Torque Command Filter Time Constant	0	0	ms	0	1000
	🗌 Ox <mark>e</mark>	:10D	-	Gain Conversion Mode	0	0	-	0	67
	🗌 0x <mark>2</mark>	10E	-	gain Conversion Time	1	1	ms	1	100
	🗌 0x <mark>2</mark>	:10F	-	Notch Filter Use	0	0	-	0	1
	_ 0x <mark></mark> 2	110	-	Notch Filter Frequency	300	300	-	0	1000
	_ 0×	:111	-	Notch Filter Bandwidth	100	100	-	0	1000
	_ 0×	112	-	Velocity Limit Switch	0	0	-	0	3
	_ 0×	113	-	Velocity Limit Value	2000	2000	rpm	0	10000
	_ 0x <mark>2</mark>	114	-	Torque Switch Value(Pcon)	200	200	%	0	300
	_ 0x <mark>2</mark>	115	-	Speed Switch Value(Pcon)	50	50	rpm	0	6000
	_ 0x <mark></mark> 2	116	-	Acceleration Switch Value(Pcon)	1000	1000	rpm/s	0	5000
ſ		117	-	Following Error Switch Value(Pcon)	2000	2000	Pulse	Π	10000

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.

LS Mecapion 4-15

- 2. As ① in <Figure 36>, click Write 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

4-16 **LS** Mecapion

Parameter Edi	ting								
			te Write	All Read		Read		EXIT	
Status System	Control In	/Out SpeedOperation Positio	nOperation Factory	Setting Fullclosed			Minimum	Marairaura I	
Object Num	SubIndex	Name		Value	Default	Unit	Value	Value	Ê
0×2000	-		Motor ID	13	999	-	0	999	
🗹 0x2001	-		Encoder Type	. 6	0	-	0	5	
0x2002	-		ncoder Resolution	10	19	bit	0	21	
🔲 0x2003	-		Power Fail Mode	0	0	-	0	3	
🔲 0x2004	-	IST <mark>2</mark> owe	Fail Check Time	20	20	ms	0	5000	
🔲 0x2005	-	7			0	-	0	65535	
🔲 0×2006	-	Regenerative hears			100	%	1	200	
🔲 0×2007	-	Regener	🔥 Error Pa	arameter Range,,!	0	ohm	0	1000	
0×2008	-	Regenerativ			0	Watt	0	30000	
🔲 0x2009	-	0	활	<u> </u>	100	%	10	100	
0x200A	-	Ove	<u></u>		50	%	10	100	
0x200B	-		PWM OFF Delay	10	10	ms	0	1000	
0x200C	-	Dynamic B	rake Control Mode	0	0	-	0	3	
0x200D	-	Basic Fund	ction Configuration	0	0	-	0	65535	
0x200E	-	Position	n Scale Numerator	1	1	-	-32768	32767	
0x200F	-	Position S	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	-	0	65535	
0x2014	0x01		DAC Output Mode	12816	12816	-	-32768	32767	
0x2014	0×02	DAC Outpu	it Channel 1 Offset	0	0	-	-32768	32767	~

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.

All Write Write All Read Read EXIT

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 'Ipa' 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.



열기					? 🛛
찾는 위치(!):	🚞 Data		~	G 🤌 📂 🛄•	
D Recent	🖪 L7_Param, Ipa	(1)			
() 바탕 화면		Ŭ			
() 내 문서					
(내 컴퓨터			\frown		
			2		
내 네트워크 환경	파일 이름(<u>N</u>):	L7_Param,Ipa		~	열기(<u>0</u>)
	파일 형식(<u>1</u>):	L / Parameter File	(*,lpa)	~	취소

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>.

Parameter Edi	ting						
		All Write Write	All Read		Read		EXIT
Status System	Control In	/Out SpeedOperation PositionOperation Factor	Setting Fullclosed	()			
🗌 Object Num	SubIndex	Name	Value	Default	Unit	Minimum Value	Mamimum A
0×2000	-	Motor I	13		-	0	999
🔽 0x2001	-	Encoder Typ	6	0	-	0	5
🔲 0x2002	-	Encoder Resolutio	19	19	bit	0	21
🔲 0x2003	-	Power Fail Mod	0	0	-	0	3
🔲 0x2004	-	RST Power Fail Check Tim	20	20	ms	0	5000
🔲 0x2005	-	7SEG Display Objec	t O	0	-	0	65535
🔲 0×2006	-	Regenerative Resistor De-rating Facto	r 100	100	%	1	200
🔲 0x2007	-	Regenerative Resistor Valu	0	0	ohm	0	1000
🔲 0x2008	-	Regenerative Resistor Capacit	0	0	Watt	0	30000
🔲 0x2009	-	Overload Check Bas	100	100	%	10	100
0x200A	-	Overload Warning Leve	50	50	%	10	100
0x200B	-	PWM OFF Dela	10	10	ms	0	1000
0x200C	-	Dynamic Brake Control Mod	0	0	-	0	3
🔲 0x200D	-	Basic Function Configuratio	0	0	-	0	65535
0x200E	-	Position Scale Numerato	r 1	1	-	-32768	32767 —
0x200F	-	Position Scale Denominato	r 1	1	-	-32768	32767
🔲 0x2010	-	Velocity Scale Numerato	r 1	1	-	-32768	32767
0x2011	-	Velocity Scale Denominato	r 1	1	-	-32768	32767
0x2012	-	Acceleration Scale Numerate	r 1	1	-	-32768	32767
0x2013	-	Acceleration Scale Denominate	r 1	1	-	-32768	32767
0×2014	0×00	SubIndex) 9	9	-	0	65535
0×2014	0×01	DAC Output Mod	12816	12816	-	-32768	32767
0×2014	0×02	DAC Output Channel 1 Offse	t O	0	-	-32768	32767 👱

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 ¹/₂ 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.

	Manual Test Operation
\sim	Manual Operation Speed
$\left(1\right)$	Manual Operation Speed 500
	2 SpeedSet Servo ON 3
1	Current Speed
4	Current Speed
(7	LOCK Forward 5 Reverse 6
	EXIT

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 Servo OFF. 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 () UNLOCK button in Figure 47 above, it only operates by clicking (5), (6) button. If you select LOCK , click (5), (6) button 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 ¹/₂ 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.

	Program_JOG					
\bigcap	Program JOG Parameter					
Ĺ	[0x2306]Program JOG Speed1	D	[RPM]	[0x230A]Program JOG Time1	500 [r	ns]
	[0x2307]Program JOG Speed2	1000	[RPM]	[0x230B]Program JOG Time2	5000 [r	ns]
	[0x2308]Program JOG Speed3	0	[RPM]	[0x230C]Program JOG Time3	500 [r	ns]
\bigcap	[0x2309]Program JOG Speed4	-1000	[RPM]	[0x230D]Program JOG Time4	5000 [r	15] 2
5			_(_	4	Apply	JX
		Current S	peed	•	Start](🕴)
						-Ψ
					EXI	г

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 Stop . 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.

LS Mecapion 4-25

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.

Gain Auto Tuning	X	
1 Tuning Setting		
Tuning Target Distance 3		
Tuning Speed		
	2	
3 Ready for Tuning		/
Result Ineria BEFORE 2		

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.

- Current Status -		Stop
	Start AutoGainTunning	

Figure 56- In Gain Auto Tuning

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

LS Mecapion 4-27



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.

Gain Auto Tuning	
Tuning Setting Tuning Target Distance	<u>3</u>
Tuning Speed	, 8
Current Status	Start
Result Ineria BIFORE 588 AFTER	585

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.

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)

Table 12 - Graph Channel Table

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.

Construit Construit <t< th=""><th></th><th></th><th>ന്നെ ര</th><th>0 I (D)</th><th></th><th></th><th></th><th></th><th></th><th></th></t<>			ന്നെ ര	0 I (D)						
Name Value	Servo Status									
Current Started 0 Command Started 0 Command Pulse -188 Command Trequency 0.0 Command Starteg	V Name	Value	0							
Command Speed 0 Command Speed 0 Prediate / View -1680 Command Pulse -1680 Prediate / View -1680 Command Pulse -1680 Command Pulse -1680 Command Pulse -1680 Product Command Frequency 0.0 Command Torque 0.0 Single-turn Data (198165 0 Command Torque 0.0 Single-turn Data(dep) 1146 Districture -500 Command Torque 0.0 Single-turn Data(dep) 1146 Districture -500 Single-turn Data(dep) 1146 Districture -500 Single-turn Data(dep) 140 Distreturn Data(dep)	Current Speed	0								
Pirefacts:Philes -188 Command Puise -188 Command Tequency 0.0 Command Tequency 0.0 Command Tequency 0.0 Command Tequency 0.0 Maximum Load 112 Command Tequency 0.0 Port Command Tequency 0.0 Maximum Load 112 Command Tequency 0.0 Port Command Tequency 0.0 Staget run Das 500 Command Tequency 0.0 Staget run Das 1500 Command Tequency 0.0 Staget run Das 1500 Command Tequency 0.00 Staget run Das 1500 Command Tequency 0.0 Staget run Das 1500 Command Tequency 0.0 Staget run Das 1500 Command Tequency 1500 <td< td=""><td>Command Sneed</td><td>0</td><td></td><td>000-</td><td>3500</td><td></td><td></td><td>200</td><td>- 500</td><td></td></td<>	Command Sneed	0		000-	3500			200	- 500	
Command Pulses -1489 -1480 -400	Feedback Pulse	-1839		500	3000 -			- 180		Save Open
Di Plavening Eror 0 Editoria Eror 0 Editoria Eror 0 Plavening Eror 0 Editoria Eror 0 Plavening Eror 0 Editoria Eror 0 Plavening Eror 0 Portari Eror 0 Portari Eror 0 Portari Eror 0 Portari Eror 0 Pagenarita Vortaria 0 Portaria Eror 0 Pagenarita Vortaria 0 Portaria Eror 0 Portaria Eror 0 Portaria Eror 0	Command Pulse	-1839		.500-				- 160	- 450	Setting
Input Command Frequency 0.0 Orunnand Treque 0.1 Waxe State Str	Enllowing Error	0		2000-	2500 -			- 140		Sampling Period 71 ms
Current Torque 0.1 0.1 0.0	Input Command Frequency	0.0			2000 -			- 120	- 400	
Command Torus 00 Accumulated OverLoad 00 Madimum Load 11.2 Madimum Load 100 Stage-tum Data 195165 OD-C-Link Volkage 3000 Single-tum Data 195165 Motor Madimum Speed 3000 Single-tum Data 195165 Of Preservice 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 3000 3000 3000 2000 3000 2000 3000 2000 3000 2000	Current Torque	0.1		500-	4500			- 100		
Accumulated OverLoad 0,0 0,0 0 0,0 </td <td>Command Torque</td> <td>0.0</td> <td></td> <td>000</td> <td>1500 -</td> <td></td> <td></td> <td>- 80</td> <td>- 350</td> <td>Y-AXIS Scale Set</td>	Command Torque	0.0		000	1500 -			- 80	- 350	Y-AXIS Scale Set
Image: Discrete field of the second of th	Accumulated OverLoad	0.0		000-	1000 -			- 60		
Torque Limit 300.0 2 0 2 0 100 0	Maximum Load	11,2	es	500-	S 500 -			-40 g	- 300 🖉	Channel Setting
PD-Link Voltage 300.0 4 0 - - - 0 - 200 - - 0 - 0 - 0 - 0 - 0	Torque Limit	300.0	1		500			- 20 5	1	Channel 1 Not Use
P Reservative Overhead 0.0 Single-turn Data 198145 O Single-turn Data 198145 Single-turn Data 0 Moder Mainum Data 0 P Reparative Overhead 0.0 Moder Mainum Data 0 P Reparative Overhead 0.0 Moder Mainum Data 0 P Rome Temperature 55 Off Moder Mainum Seed 3000 O Moder Mainum Seed 0000 State Speed 3000 O Moder Mainum Seed 0 O P Paak Version 3200 O P Paak Version 3200 O Sternal Encoder Polition 0 O T 0 Not 1000 Sampling Time 0 (ms) 1 scale 0 V Name Value Not 1000 Servo Input 0 Not 1000 Sannaling Time - 0 (ms) 1 scale 0 V Name Value	DC-Link Voltage	300.0		0-	∠ 0-			+0 Z	- 250 2	
Single-turn Data 19816 Single-turn Data(deg) 134.6 O 000- Hold 1500- -1500- -100- -1500- -100- O -100- </td <td>Regenerative Overload</td> <td>0,0</td> <td></td> <td>500</td> <td>-500 -</td> <td></td> <td></td> <td>20</td> <td></td> <td>Channel 2 Not Use</td>	Regenerative Overload	0,0		500	-500 -			20		Channel 2 Not Use
Single-tum Data(deg) 134.6 0 Multi-tum Data 0 Multi-tum Data 0 Moor Tables 0 Moor Malming Speed 3000 V Moor Malming Speed 3000 V Moor Malming Speed 000 V Moor Malming Speed 000 V Moor Malming Speed 000 V Phase Current 2.88 V Phase Current Offset 0 V PFGA Version 3.2 Perform all Encoder Position 0 V Stristion 0.05 Serve Input • ax Serve Output • ax Serve Input • ax Name Value NOT • ax Not • ax <	Single-turn Data	196145		-000-	4000			40	- 200	
Multi-tum Data 0 PRoom Temperature 95 More Trade Speed 3000 2000 -1500 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 100 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 2000 -100 <td>Single-turn Data(deg)</td> <td>134,6</td> <td>D</td> <td>000-</td> <td>-1000 -</td> <td></td> <td></td> <td>60</td> <td></td> <td>Channel 3 Not Use</td>	Single-turn Data(deg)	134,6	D	000-	-1000 -			60		Channel 3 Not Use
Beam Imperature 95 500	Multi-turn Data	0			-1500 -			80	- 150	
Morr Rede Gyped 000 Motor Madi Ourrent 280 V Phase Current 280 V Phase Current Offset 0 V Prescurrent Offset 0 V Prescurrent Offset 0 V Prescurrent Offset 0 V Prescurrent Offset 0 Service Output • a × Vort • a × Name Value Name Value NAT • a × Service Output • a × Communication Status • a × Service Output <t< td=""><td>Room Temperature</td><td>55</td><td></td><td>500-</td><td>2000</td><td></td><td></td><td>100</td><td></td><td>Channel 4 Not Use</td></t<>	Room Temperature	55		500-	2000			100		Channel 4 Not Use
Motor Maximum Speed 500 2500 - <td>Motor Rated Speed</td> <td>3000</td> <td></td> <td>000</td> <td>-2000 -</td> <td></td> <td></td> <td>120</td> <td>- 100</td> <td></td>	Motor Rated Speed	3000		000	-2000 -			120	- 100	
Morr Name Value Morr Name Value Nor Name Nor Name Nor Name Nor Sanka Nor Name VAlue Name Nor Sanka Nor Sanka Nor Sanka Nor Sanka Name Value Name Value NAME Serve Output Nor Sanka Nor Sanka Nor Sanka Name Value NAME Sanka	Motor Maximum Speed	5000		000-	-2500 -			140		
UP bhase Current Offset 0 000 3500 Sampling Time : 0 (ms) 1 scale 100 Asiv Sunt Suo Ext UP bhase Current Offset 0 3500 Sampling Time : 0 (ms) 1 scale 200 0 Asiv Sunt Suo Ext UP bhase Current Offset 0 - <td>Motor Rated Current</td> <td>2,89</td> <td></td> <td>2500-</td> <td>-3000 -</td> <td></td> <td></td> <td>160</td> <td>- 50</td> <td></td>	Motor Rated Current	2,89		2500-	-3000 -			160	- 50	
Ø V Paae Curren Offset 0 Ø PfeA Version 3.2 Ø Eversian 0 Ø Eversian 0 Ø Eversion 0 Ø Eversion 0 Ø Eversion 0.05	U Phase Current Offset	0			-5000			180		Apply Start Stop EXIT
Image: Picture Encoder Policy of Status 3.2 Encoder Following 0 Encoder Following 0 Service Incoder Following 0 Marce Name Value Name Name Value Nanana Value Nanana	V Phase Current Offset	0		000-	-3500	Semalia Time : 0 Ima	V d ecolo	-200	- 0	
External Encoder Position 0 External Encoder Position 0 Prededack 0 OS Version 0.05 Port 0 Name Value NOT 0 POT 0 REX Name Value Name Value Name Value Name Value RDV BRK 0 NPOS NARN	FPGA Version	3.2				Sampling Time . o [ma	ly i acale			
Name Value NoT AlM ROV AlM ROV BRK NOR BRK NARST AlM	External Encoder Position Feedback	0		Ц						
WOS Version 0.05 Servo Input • a x Servo Input • a x Name Value POT • a x NOT • B K RDV • B K NPOS • NPOS NISPD • ANN	External Encoder Following Error	0		1						
Serve input • a x Serve Output • a x Communication Status • a x Por A	OS Version	0,05		-						
Servo Output • a x Servo Output • a x Name Value NoT Image: Communication Status • a x RDV Image: Communication Status • a x Serve Output Image: Communication Status • a x ALRST Image: Communication Status • a x MPOS Image: Communication Status • a x MAN Image: Communication Status • a x MPOS Image: Communication Status • a x MAN Image: Communication Status • a x MPOS Image: Communication Status • a x MAN Image: Communication Status • a x MPOS Image: Communication Status • a x MAN Image: Communication Status • a x MAN Image: Communication Status • a x MAN <				- 1						
Name Value POT AlM HOME FDV FDV BRK ALRST BRK	Servo Input		• 4	×s	ervo Output			▲ 廿 ×	Communie	cation Status 👻 🕫 🗙
POT	Name		Value	ТΓ		Name Valu	e			
NOT ROV	POT		-	A	LM					
HOME POCIN GAIN2 ALIST A	NOT			R	DY				-	
PCON GAINZ ALRST A	HOME			Z	SPD					
GAN2 ALRST ALRSD WARD WARD	PCON			В	RK					
ALRST	GAIN2			II.	VPOS				6	
	ALRST			II.	VSPD				4	
				W	/ARN					

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.

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

Table 13 - DataTrace Graph properties



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>.

lata Tra	ce		
3000-	3400 -		
2800-	3200 -	- 180 - 180	
2600-	3000 -		ʹ
2400-	2800 -	- 120 - 400 Sampling Period 10 ms 1	
2200	2600 -	- 100	
2200-	2400 -	– 80 – 350 Y-Axis Scale Set Y-Axis	
2000-	2200 -	- 60	1
물 1800-	<u> ජී</u> 2000 –		
j 1600-	 호 1800 -	- 20 호 ca 호 Channel 1 Not Use	
1400-	- 1600 -	-0 - 200-	
1200-	1400 -		
1000	1200 -	-60 Channel 3 Not Use	
1000-	1000 -	80 - 150	
800-	800 -	100 Channel 4 Not Use	
600-	600 -	120 - 100	
400-	400 -	- 140	
200-	200 -		
0_	0	-100 - 0 Appy Start Stop EXI	0
Ŭ	Ŭ	Sampling Time : 0 (ms)/ 1 scale	చ

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





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



열기				? 🛛
찾는 위치(!):	🇀 Data		💽 🕝 🤌 📂 🛄 -	
CO Recent	,∎L7_DataTrace			
() 바탕 화면		\bigcirc		
내 문서				
및 내 컴퓨터		\cap		
S		2		
내 네트워크 환경	파일 이름(<u>N</u>):	L7_DataTrace,Idg	~	열기(<u>0</u>)
	파일 형식(<u>T</u>):	L7 TriggerGraph File(*,Idg)	~	취소

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.

180048048								
Strive Status	• • • • • • • • • • • • • • • • • • •	×			_			
Nome		Trigger	Tra pe					
	value Unit							
Current Speed	rpm	3000-	3400 -			- 200	- 500	FFT Save Open
Command Speed	rpin	0000	2200-			- 180		Setting
Command Pulse	pulse	2000-	2000			- 160	- 450	Sampling Period 1 X 200us
Pulse Error	pulse	2600-	3000-			- 140		Tripper Source Data Ourrent Speed
Pulse Frequency	Kope	2400-	2800 -			- 120	- 400	
Current Torque	10pps %	2200-	2600 -			- 100		Trigger Edge Positive
Command Torque	, . %	2000	2400 -			- 80	- 350	Trigger Position 0
Accumulated OverLoad Bate	*	2000-	2200 -			- 60		Tringer Level 0
Maximum Load	*	j≝ 1800-	്ട് 2000 -			- 40 🖇	- 300 g	
Torque Limit	%	<u> </u> 5 1600-	<u> </u> 5 1800 -			- 20	i	Y-Axis Scale Set Y-Axis
DC Link Voltage	V	- 1400-	- 1600 -			-0 2	- 250 ~	
Input Status	-	4000	1400 -			20	200	Channel Setting
Output Status	-	1200-	1200 -			40	- 200	Channel 1 Not Use
ABS Single Turn	pulse	1000-	1200-			80	- 150	
ABS Single Turn[deg]	degree	800-	1000-			100	150	Channel 2 Not Use
Software Version	-	600-	800 -			120	- 100	Channel 3 Not Use
FPGA Version	-	100	600 -			140		
		400-	400 -			160	- 50	Channel 4 Not Use
Convo Input	- 0	200-	200 -			180		
Serve inper	• •	- 0-	0-			-200	L 0	Apply Start Stop
ivame	value					[ms]		
Servo On								
Speed1								
Speed2								
Speeds								
Alarmi neset								
CCWLimit								
CW Limit		0			_			
Emergencu		Servo Out	put			▼ # X !	Jommunicatio	on Status 🗸 🗸
Ston			Name	Va	ilue			
Electric Gear 1		Alarm						
Electric Gear 2		Ready						
P Control		Zero Spee	d					
Gain 2		Brake						
Pulse Clear	=	In Position	1					
		Torque Lir	mit				-	
Torque Limit		Velocity L	imit					
Torque Limit Mode					The second secon			
Torque Limit Mode ABS Encorder Call		In Speed						

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





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

Category	Details
Data Sampling Time	Support 200us to 200ms
V avia	- Scale Size: 200us*Sampling Period/scale
X-8XIS	- Initial scale size fixed (drag to enlarge)
	- Scale size adjustable (not changeable during operation)
	- Y-axis 1: Channel 1 (red graphic line)
Y-axis	- Y-axis 2: Channel 2 (green graphic line)
	- Y-axis 3: Channel 3 (blue graphic line)
	- Y-axis 4: Channel 4 (pink graphic line)

Table 14 - Trigger Graph properties

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.

Trigger Trace	$\times 4$	
		/
3000		
2800- 3200 - 180 - 2600 - 180	-	. 1
2600 - 160 - 450 Sampling Period 1 X 200us		L
2800 - 140 Trigger Source Data Current Speed		
2400- 2600 Trigger Edge Positive	~	
2200- 2400		
2000- 2200 60 (0 ~ 255)		
\$ 1800- \$ 2000 - Trigger Level 0		
5 1600 - 20 5 7 Y-Axis Scale Set Y-Axis		
100		Υ.
1200	2	
		/
800 100		·
600 - 500 120 - 100 Channel 3 Not Use	~	
400- 400		
200 50 50		
		3
U U U U Apply Start Stop		-

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

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

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.

Stop



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.



다른 이름으로 저	장					? 🔀
저장 위치([):	🗀 Data		~	3 🕫	• 🖭 👏	
D Recent						
() 바탕 화면						
() 내 문서						
						
내 네트워크 환경	파일 이름(<u>N</u>):	I			~	저장(<u>S</u>)
	파일 형식(<u>T</u>):	L7 TriggerGraph File(*,Itg)			*	취소

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 'Itg' format.

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

열기	2
찾는 위치(!):	🔁 Data 💽 🕜 🎓 🖽 •
D Recent	I 1
() 바탕 화면	
(년 문서	
내 컴퓨터	
내 네트워크 환경	파일 이름(N): L7_TriggerTrace.ltg 2 열기(<u>0</u>)
	파일 형식(I): L7 TriggerGraph File(+,ltg 취소

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.



SELIVE-I.C.E_L7N									-
File Communication Param	neter Mo	nitor Operation Al	arm Help OS						
1 📇 🕞 🗩 🖪 🖻	i 🦦 🖶 🤞	St 🚯 🕦 🖾 🖽 🗖	1 🕼 🖓 🛛 🗍						
Servo Status		▼ ‡ X							
🔲 Name	Valu	ue Unit							
Current Speed		rom							
Command Speed		rom							
Feedback Pulse		pulse							
Command Pulse	· •								
Following Error	larm Ira	ace						X	
Input Command Frequen	2000	2500				000	500		
Current Torque	3000-	3500				200	- 500	SAVE OPEN	
Command Torque	2500-	3000				160	450	Setting	
Accumulated OverLoad		2500				- 140	- 450	Sampling Period 1 X 200us	
Maximum Load	2000-	2000				- 140	400		
🔲 Torque Limit	1500	2000				100	- 400	Y-Axis Scale Set Y-Axis	
DC-Link Voltage	1500-	1500				80	350	Channel Setting	
Regenerative Overload	1000-	1000				- 60	550		
Single-turn Data	e e	9				- 40 8	- 300 8	Channel 1 Not Use	
Single-turn Data(deg)	g 500-	500				- 20 D	See S		
Multi-turn Data	ž "	ž .					- 250 Ž	Channel 2 Not Use	
Room Temperature	Ť					20	200		
Motor Bated Speed	-500-	-500				40	- 200	Channel 2	
Motor Maximum Speed		-1000				60	200	Not Use	
Motor Rated Current	-1000-	4500				80	- 150	Channel 4	
U Phase Current Offset	-1500-	-1500-				100		Charmer 4 Not Use	
V Phase Current Offset		-2000				120	- 100	Status	
FPGA Version	-2000-	-2500				140			
External Encoder Positio	0500	2000				160	- 50		
Heedback	-2500-	-3000				180			
External Encoder Follow	-3000	-3500				-200	L 0	Apply Upload	
OS Version						[ms]			
Servo Input		★ 廿 ×	Servo Output			-		▼ # × Communication Status	
Name		Value		Name	Value				
POT			ALM						
NOT			RDY						
HOME			ZSPD						
PCON			BRK						
GAIN2			INPOS						
ALRST			INSPD						
			-						

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				
Y avia	- Scale Size: 200us*Sampling Period/scale				
Λ-άλιδ	- Initial scale size fixed (drag to enlarge)				
	- Scale size adjustable (not changeable during operation)				
	- Y-axis 1: Channel 1 (red graphic line)				
Y-axis	- 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>.

Alarm Tr	ace	×	
3000-	3400 -		/
2800-	3200 -	- 180 Setting	
2600-	3000 -	- 160 - 450 Sempling Period 1 X 200us	<u>۱</u>
2400-	2800 -		L
2200-	2600 -	- 100	
2000-	2400 -		
ន <mark>្ល</mark> 1800–	8 2000 -	- 40 % - 300 % Channel 1 Not Use	۱.
⊃ ಕ1600-	⊃ ²⁰⁰⁰ ち 1800 -	_ 20 ਦੋ ਦੋ ਦੋ]
2 1400-	2 1600 -	- 0 Z - 250 Z Channel 2 Not Use	
1200-	1400 -	20 - 200 Channel 3 Junities (197	
1000-	1200 -	60	
800-	1000 -	80 150 Channel 4 Not Use	
600-	800 -		
400-	600 -		
200-	400 - 200 -		
	200	180 - 0 Apply Upload	
	-	[ms]	
		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>.

shown in <Figure 71> and

- 4. Click 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

button is activated.



Figure 71- Message: Alarm data collection completed

7. Click 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.



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 button in (5) of the above <Figure 70> to see the following screen.

열기		?×
찾는 위치(<u>l</u>):	🔁 Data 💽 🕜 🏂 💷 -	
D Recent	L7_Alarm Trace, lag	
[] 바탕 화면		
내 문서		
내 컴퓨터	\sim	
	2	
내 네트워크 환경	파일 이름(N): L7_Alarm Trace,lag	0
	파일 형식(I): L7 AlarmGraph File(*,lag) 💉 취소	소

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.



:) A () () A ()	영문 왕 소	o 🗇 🗑	1 🚇 🖵 🛛				0			
Servo Status		- 1 X		Alorm History						
Name	Value	Unit		Alarm History						
Current Sneed		rnm		Alarm History		Recent Data N				
Command Sneed		rnm		Alarm N	lum	Namo	VV	·		
Eedback Pulse		nulse		1	ium -	Traine				
Command Pulse		pulse								
Following Error		pulse		2						
Input Command Frequency		Khz		4						
Current Torque		%		4						
Command Torque		%								
Accumulated OverLoad		%		7						
Maximum Load		%		8						
Torque Limit		%								
DC-Link Voltage		V		10						
Regenerative Overload		%		11						
Single-turn Data		Pulse		12						
Single-turn Data(deg)		Degree		13						
Multi-turn Data		rev		14						
Room Temperature		°C		15						
Motor Rated Speed		rpm		16						
Motor Maximum Speed		rpm		17						
Motor Rated Current		A		18						
U Phase Current Offset		mA		19						
V Phase Current Offset		mA		20						
FPGA Version		-								
External Encoder Position		_								
External Encoder Following						Update Clea	r 📘			
Error										
US Version										
Servo Input		▼ ‡ ×	Servo Outpu	ut				▼ ‡ × Comr	munication Status	
Name		Value		Name		Value				
POT			ALM							
NOT			RDY							
HOME			ZSPD							
PCON			BRK							
GAIN2			INPOS							
ALRST			LINSPD							

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.



	Alarm Num	Name	
1			
2			
3			
4			
5			
7			
8			
9		 	
10			
11			
12			
13			
14			
15		 	
17			
18			
19		 	
20			

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.





Alarm Num AL = 52 AL = 52	Name EMG
AL - 52 AL - 52	EMG
AL - 52	
	EMG
AL - 52	EMG
AL - 52	EMG
AL - 52	EMG
AL - 43	Control Power Fail
AL - 42	RST Power Fail
AL - 42	RST Power Fail
AL - 43	Control Power Fail
AL - 43	Control Power Fail
AL - 42	RST Power Fail
AL - 64	Parameter Range
	AL - 43 AL - 42 AL - 42 AL - 43 AL - 43 AL - 64 AL - 64

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 81- Message box: Alarm Reset Success

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



4-43

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.

LINE-LCE L7N				
File Communication Parame	ter Monitor Operati	on Ala	m Help OS	
┘ІЁ҇҇҇҇҇҇҇҇҇҇҇҇҇҇҇҇҇│╝│╝╔╝	Va 岩 42 🚸 🕐 🛄			
Name I	Value Us	. 1		
	value Uli	n.		
Uurrent Speed		rpm		
Command Speed		rpm		
Feedback Pulse	F	ouise		
Command Pulse	F	ouise		
Following Error	F	UISe		
Input Command Frequency		Khz		
Current lorque		76		\frown
Command Torque		%		
Accumulated OverLoad		%		
Maximum Load		%		4
Torque Limit		%	anim	
DC-Link Voltage		V	CAUTION!!	$\mathbf{\Psi}$
Regenerative Overload		%	1. Cut off the main power (3-phase power) and control power of Servo	Drive.
Single-turn Data	F	Pulse	2. Motor can be operated abnormally so, disconnect cable between Serv	ro Drive
Single-turn Data(deg)	De	gree	and Motor.	
🔲 Multi-turn Data		rev	Connect LISE Cable	
Room Temperature		°C	t. Turner the control course	
Motor Rated Speed		rpm	4. Turn on the control power.	
Motor Maximum Speed		rpm	warnning!!: Machine can be crashed while downloading so,	
Motor Rated Current		Α	be sure to disconnect main power(3-phase power).	
🔲 U Phase Current Offset		mΑ	And confirm that charge lamp is turned off.	
V Phase Current Offset		mA	5. Execute firmware upgrade with download program.	
FPGA Version		-	5. For download, it can take several minutes	
External Encoder Position Feedback		-		
External Encoder Following Error		-]
US Version		_		
Servo Input		- 4 ×	Servo Output	▼ ‡ × Communication Status ▼
Name	Va	lue	Name Value	
POT			ALM	
NOT			BDY	
HOME			ZSPD	
PCON			BBK	
GAIN2			INPOS	
ALBST			INSPD	

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>.

열기					(? 🗙
찾는 위치(!):	🗀 L7 download		~	G 💋 📂		
D Recent	Constant bootloader Constant Constant bootloader Constant bootloader bootload					
() 바탕 화면						
내 문서						
내 컴퓨터						
내 네트워크 환경	파일 이름(<u>N</u>): 파일 형식(<u>T</u>):	 APD-L7 HEX File(*,hex)		~	· 열기((취소	

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.)


	L7 Upgrader	
		LS Mecapion
	File Path	
	Progress	
\bigcap_{1}		
Ú	ComSet	Ready Download Close

Figure 85- File path inserted screen

- **6.** Click \bigcirc 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.

L7 Upgrader
LS Mecapion
File Path
D:\L7\L7 download\l7.hex
Progress
ComSet 1 Ready Download Close

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>.



L7 Upgrader	
	LS Mecapion
File Path	
D:₩L7₩L7 download₩I7.hex	
Progress	
ComSet	Ready Download Close

Figure 88 - Downloading screen

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

L7 Upgrader 🛛 🔀				
⚠	Firmware Download Completion!!			
	확인			

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 Edge : 0 Channel 1 : Current Speed

Trigger Source Data : Current Speed Trigger Level : 500



Figure 91- Display of Trigger detection

- 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 ______ 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	
	Name			
Customer	Address			
	Phone			
	Name			
Retailer	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. Ismecapion.com) for useful information and services.



5-3

User Manual Revision History

Number	Issued Year and Month	Revised Content	Version Number	Notes