LEC-OM05806 (Doc no. JXC※-OMT0054-A)



Operation Manual (Simplified edition)

PRODUCT NAME

AC Servo Motor Driver (Pulse input type)

MODEL / Series / Product Number

LECSB Series



SMC Corporation

SMC

<u>文書管理 No.</u> – 旧文書体系 No. 対応表

文書管理 No.	旧文書体系 No.
JXC*-OMT0054	LEC-OM05805
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本書は、対応文書の原紙と一緒に保管する。

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LECSB Series / Driver Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems

ISO 4413: Hydraulic fluid power -- General rules relating to systems

IEC 60204-1: Safety of machinery -- Electrical equipment of machines (Part 1: General requirements)

ISO 10218-1992: Manipulating industrial robots -- Safety

JIS B 8370: General rules for pneumatic equipment.

JIS B 8361: General rules for hydraulic equipment.

JIS B 9960-1: Safety of machinery - Electrical equipment for machines. (Part 1: General requirements)

JIS B 8433-1993: Manipulating industrial robots - Safety. etc.

*2) Labor Safety and Sanitation Law, etc.

 Image: Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

 Image: Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

 Image: Caution indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 Image: Caution indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 Image: Caution indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be

performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1) Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2) Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and lock circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.



3) An application which could have negative effects on people, property, or animals requiring special safety analysis.

4) Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Note that the \triangle CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.



LECSB Series / Driver Safety Instructions

Caution

The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product.

Limited warranty and Disclaimer

The warranty period of the product is 1 year in service or 1.5 years after the product is delivered. whichever is first.*3)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*3) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).

Introduction

It is recommended that the operator read the operation manual for LECSB prior to use. For the handling and details of other equipment, please refer to the operation manual for used equipment.

Check that the main circuit power supply (AC100V/AC200V) and controller circuit power supply (AC100V/AC200V) are wired correctly.

Please refer to chapter 3.1 of the "LECSB Operation Manual" and chapter 3 of the "LECSB Operation Manual (Simplified Edition)" for details.

Please put the wiring for EMG (Emergency stop) into the state of EMG release (operational). However, EMG (Emergency stop) cannot be compulsorily set to automatic ON by the parameter.

When setup software (MR Configurator2[™]) is used, the LECSB model selection is required. Select 'MR-J3-A' through "Model" - "New" and "Project".

Term

Position control mode	Control	the	motor	rotation	speed/direction	and	execute	precision
FOSILION CONILION MODE	positioni	ng/st	opping	with high-	speed pulse train			

1. Configuration

Minimum equipment and wiring requirements to get started



(*1) Refer to "LECSB Operation Manual", Chapter 3 if the power supply voltage is 100VAC.

1	Driver	LECSB*-S*
2	Motor cable	LE-CSM-***
3	Encoder cable	LE-CSE-***
4	I/O connector	LE-CSNB
	I/O cable	LEC-CSNB-1
5	USB cable	LEC-MR-J3USB
6	Setup software	LEC MDC3*
	(MR Configurator2 [™])	LEG-WIRG2
7	Main circuit power	
	supply connector	CINFT (ACCESSORY)
8	Control circuit power	CNP2 (Accessory)
	supply connector	CINFZ (ACCESSOLY)
9	Motor connector	CNP3 (Accessory)
10		LEC-MR-J3BAT (a bundled item)
	Battery	It is unnecessary when using it with the incremental
		system.

Note) The lock cable option is not shown on this drawing. Refer to the "LECSB Operation Manual" for details.

2. Procedure before operation

2.1 Flow chart



3. Wiring

3.1 Wiring for power supply

Connect the actuator and driver power supply. This wiring diagram is common for each mode.

(1) LECSB (Absolute encoder)

EX.) Power supply voltage is 200VAC single phase



- [1] Provide specified power supply to input terminals L_1 and L_2 .
- [2] Connect the motor power supply input terminal (U, V, W) to the driver power terminal (U, V, W). - Connect the motor ground terminal to the driver ground terminal.
 - Connect the cable for detector.
- [3] Connect the 24VDC external power supply to the power supply for the control circuit.

Refer to "LECSB Operation Manual", Chapter 3 when the power supply voltage is 100VAC.

3.2 I/O signal connection for each mode

The example of connecting driver's I/O signal is shown.

3.2.1 Position control mode (Sink I/O interfaces)

(1) Connection example

A connection example of the position control mode is shown below. Connect wires if necessary.

This is the wiring example using PLC of Mitsubishi Electric (QD75D) used for position control mode. (Connection example of the differential receiver system) Refer to the operation manual of LECSB and the technical data and the operation manual of PLC and positioning unit.



Refer to "LECSB Operation Manual", section 3.2 for wiring details.

Refer to "LECSB Operation Manual (Simplified Edition)", section 3.2.1 (2) and (3) for input/output signal details.

- (2) Input signal
 Position control mode: P, Speed control mode: S, Torque control mode: T
 ●: Automatic ON can be set, O: Initial setting, □: Assignment is available with parameter,

-: Assignment is not available

Device name	Symbol	Automatic ON	Ρ	S	Т	Function
PP	Forward rotation pulse train	-	0	-	-	In the open collector system (max. input frequency 200kpps)
NP	Reverse rotation pulse train	-	0	-	-	Reverse rotation pulse train across NP-DOCOM
PG	Differential forward rotation pulse train	-	0	-	-	In the differential receiver system (max. input frequency 1Mpps)
NG	Differential reverse rotation pulse train	-	0	-	-	Forward rotation pulse train across PG-PP Reverse rotation pulse train across NG-NP
SON	Servo-on	•	0	0	0	Operation is available when SON is turned ON.
RES	Reset	-	0	0	0	Alarm can be reset.
LSP	Forward rotation stroke end	•	0	0	-	Turn this signal on before operation. When this signal turns off, the product is stopped suddenly and servo lock is enabled.
LSN	Reverse rotation stroke end	•	0	0	-	Turn this signal on before operation. When this signal turns off, the product is stopped suddenly and servo lock is enabled.
TL	External torque limit selection	•	0		- Analog torque limit (TLA) is enabled when it is turned	
TL1	Internal torque limit selection	-				When this signal turns on, the torque will be lower than the set parameter torque.
ST1	Forward rotation start	-	-	0	-	Start the servo motor.
ST2	Reverse rotation start	-	-	0	-	Start the servo motor.
RS1	Forward rotation selection	-	-	-	0	Servo motor torque generating direction is selected.
RS2	Reverse rotation selection	-	-	-	0	Servo motor torque generating direction is selected.
SP1	Speed selection 1	-	-	0	0	
SP2	Speed selection 2	-	-	0	0	The Commanded rotation speed during operation or analog mode is selected.
SP3	Speed selection 3	-	-			
PC	Proportion control	●	0		-	When this is turned ON, the amplifier will be changed from the proportional integral (IP) type to proportional type.
EMG	Forced stop	-	0	0	0	When this signal turns on, forced stop can be released.
CR	Clear	-	0	-	-	When this is turned ON, droop pulse is eliminated.
LOP	Control change	-	0	0	0	When operating in two modes, the control mode will be changed.

(3) Output signal

Position control	mode: P, Speed control mode: S,	, Torque control r	mode: T	
O: Initial se	tting, □: Assignment is a	vailable with	parame	eter, —: Assignment is not available
Dovice				

Device name	Symbol	Р	S	Т	Function	
ALM	Problem	0	0	0	This signal turns off while alarm is generated.	
DB	DB Dynamic brake interlock O O O This device is necessary to use an external dynamic This can be used by setting parameters.		This device is necessary to use an external dynamic brake. This can be used by setting parameters.			
RD	Ready	0	0	0	When servo-on turns on and operation is available, this signal turns on.	
INP	In-position	0	-	-	This signal turns on when the accumulated pulse is within the setting range.	
SA	Speed reached	-	0	-	When the servo motor rotation speed reaches the set speed, this signal turns on.	
VLC	Limiting speed	-	-	0	This signal turns on when reaching the speed restricted by parameter.	
TLC	Limiting torque	0	0	-	This signal turns on when reaching the torque set by parameter while torque is generated	

3.2.2 Speed control mode (Sink I/O interfaces)

(1) Signal connection example LECSB

A connection example of the speed control mode is shown below. Connect wires if necessary.



Refer to "LECSB Operation Manual", section 3.2 for wiring details.

Refer to "LECSB Operation Manual (Simplified Edition)", section 3.2.1 (2) and (3) for input/output signal details.

3.2.3 Torque control mode (Sink I/O interfaces)

(1) Signal connection example of LECSB

A connection example of the torque control mode is shown below. Connect wires if necessary.



Refer to "LECSB Operation Manual", section 3.2 for wiring details.

Refer to "LECSB Operation Manual (Simplified Edition)", section 3.2.1 (2) and (3) for input/output signal details.

3.2.4 Source I/O interfaces

In this driver, source type I/O interfaces can be used. In this case, all DI-1 input signals and DO-1 output signals are of source type. Perform wiring according to the following interfaces.

(1) Digital input interface DI-1



(2) Digital output interface DO-1

A maximum of 2.6V voltage drop occurs in the driver.



Note. If the voltage drop (maximum of 2.6V) interferes with the relay operation, apply high voltage (up to 26.4V) from external source.

4. Parameter list for each mode

Parameters require setting. If necessary, please set the parameters.

Refer to "LECSB Operation Manual", chapter 5 and "LECSB Operation Manual (Simplified Edition)", section 5.3 for details.

Refer to "LECSB Operation Manual", chapter 5 for parameters which are not mentioned in this clause.

Setup software (MR Configurator2[™]: LEC-MRC2E) is necessary for the setting of parameter.

*1 Setup software version 1.52E or above is required.

*2 The setup software (MR Configurator2[™]: LEC-MRC2E) must be purchased as an additional item.

*3 The USB cable (LEC-MR-J3USB) must be purchased as an additional item.

4.1 Parameters common to each mode

(1) Basic setting parameters (No.PA□ □)

No.	Symbol	Name	Initial value	Unit
PA01	STY	Control mode	0000h	

(2) [I/O setting parameters (No. PD ...)]

These parameters are set when changing the assignment of the input/output signal and selecting the input signal automatic ON.

Refer to "LECSB Operation Manual", section 5.4 and "LECSB Operation Manual (Simplified Edition)", section 5.5 for details.

4.2 Position control mode

(1) [Basic setting parameters (No.PA□□)]

No.	Symbol	Name	Initial value	Unit
PA05	FBP	Number of command input pulses per revolution	0	
PA06	СМХ	Electronic gear numerator (Command pulse multiplying factor numerator)	1	
PA07	CDV	Electronic gear denominator (Command pulse multiplying factor denominator)	1	
PA08	ATU	Auto tuning mode	0001h	
PA09	RSP	Auto tuning response	12	
PA10	INP	In-position range	100	pulse
PA13	PLSS	Command pulse input form	0000h	
PA14	POL	Rotation direction selection	0	

4.3 Speed control mode

(1) [Basic setting parameters (No.PA ...)]

No.	Symbol	Name	Initial value	Unit
PA08	ATU	Auto tuning mode	0001h	
PA09	RSP	Auto tuning response	12	

(2) [Extension setting parameters (No. PC ...)]

No.	Symbol	Name	Initial value	Unit
PC01	STA	Acceleration time constant	0	ms
PC02	STB	Deceleration time constant	0	ms
PC05	SC1	Internal speed command 1	100	r/min
PC06	SC2	Internal speed command 2	500	r/min
PC07	SC3	Internal speed command 3	1000	r/min
PC08	SC4	Internal speed command 4	200	r/min
PC09	SC5	Internal speed command 5	300	r/min
PC10	SC6	Internal speed command 6	500	r/min
PC11	SC7	Internal speed command 7	800	r/min

4.4 Torque control mode

(1) [Extension setting parameters (No. PC)]

No.	Symbol	Name	Initial value	Unit
PC01	STA	Acceleration time constant	0	ms
PC02	STB	Deceleration time constant	0	ms
PC05	SC1	Internal speed limit 1	100	r/min
PC06	SC2	Internal speed limit 2	500	r/min
PC07	SC3	Internal speed limit 3	1000	r/min
PC08	SC4	Internal speed limit 4	200	r/min
PC09	SC5	Internal speed limit 5	300	r/min
PC10	SC6	Internal speed limit 6	500	r/min
PC11	SC7	Internal speed limit 7	800	r/min

5. Parameter Configuration using Setup software (MR Configurator2[™])

This section describes the configuration procedure for main parameters using the setup software (MR Configurator2[™]: LEC-MRC2E). See chapter 5 of the "LECSB Operation Manual" for parameter details.

5.1 Setup software (MR Configurator2[™])



- *1 Setup software version 1.19V or above is required.
- *2 The setup software (MR Configurator2[™]: LEC-MRC2E) must be purchased as an additional item.
- *3 The USB cable (LEC-MR-J3USB) must be purchased as an additional item.

5.1.1 Installation Method

Perform installation according to the "MR Configurator2[™] instruction manual" (Manual/ib0300160*.pdf) contained on the setup software (MR Configurator2[™]) CD-ROM. The "MR Configurator2[™] software will be added to the PC.

5.2 Basic driver set-up for Initial Test Drive

Switch on the main circuit power supply (AC100V/AC200V) and controller circuit power supply (AC100V/AC200V) to the LECSB driver.

When the driver display flashes as shown below, it wires for EMG (Emergency stop) and ON (state of EMG release (operational)). However, EMG (Emergency stop) cannot be compulsorily set to automatic ON by the parameter.



If you turn on the power supply for the first time, refer to "LECSB Operation Manual", chapter 4.

5.2.1 Start up the Setup software (MR Configurator2[™]) ① Connect the PC and LECSB using the USB cable.

- 2 Turn on the power of the LECSB.
- ③ Start application "MR Configurator2".

MELSOFT 77° ₩α-3/a \		
MELSANSwebホームページへ		
GX Works2		
🐌 MR Configurator		
MR Configurator2		
MR Configurator2		
IMR-J4(W)-B モード変更		
🄁 取扱説明書	Ŧ	
前に戻る	-	
プログラムとファイルの検索 👂		
S 🥖 🚞 🔊	5250	

Once the application starts, the screen below will be displayed.



5.2.2 "System Settings"

① From "Project" menu select "New", the "New project" window will be displayed.

- N	ELSOFT MR Configur	ator2 New	/ project		_		A 12 Mar	100	and the second se	the second second	
i Pr	oject View Parameter	Safety	Positioning-data Moni	or Diagnosis	Test Mode	Adjustment Tools Window	Help				
Ľ	New	Ctrl+N	🔁 🕄 🐲 🖾 🗈 🧎	9000							
	Open	CRI+O									
	Close										
	Save Ar	Ctri+5				New Project		×			
	Delete					Model	MD 12 A				
	Read Other Format	•			2	Hoder	MR-JJ-A				
	Write Other Format	•				Operation mode		×			
	System Setting					Multi-ax. unification		~			
	Print Preview					Station	00				
Æ	Print	Ctrl+P									
	Exit MR Configurator2	Alt+F4				option unit	No Connection				
						Connection setting Servo amplifier Servo amplifier Com. speed Port No. Search com. spe The last-used projec the application is res	connection USB connection RS-422 (AUTO AUTO AUTO twill be opened wh tarted	RS-232C)			
New						[Station 00]	MR-13-A Servo amplifier	connection: LISB			OVR CAP NUM SCR

5.2.3 Model Selection

① The Mitsubishi Electric Corporation series will be displayed in the model selection list. Please select MR-J3-A if using the LECSB.

The station should be set to 00.

The setting should match the setting of parameter [PC20].

The default value of parameter [PC20] is [0].

When using LECSB for the first time please use the default value for parameter [PC20] which is set to [0], and please set [Station] to [00]

- ② Please select "servo amplifier connection USB" as the communication device.
- ③ Click OK.
- ④ Click OK.

Model	MR - 13-A		
O K			
Operation mode		<u> </u>	
Multi-ax. unificat	ion	<u> </u>	
Station	00	~	
Option unit	No Connection		
 Connection setting (•) Servo amplif 	ier connection USB		
Connection setting	ier connection USB	((0, 2225)	
Connection setting (•) Servo amplif	ier connection USB	(RS-232C)	
Connection setting (•) Servo amplif Com, speed	ier connection USB ier connection RS-422 AUTO	(RS-232C)	
Connection setting	ier connection USB ier connection RS-422 AUTO AUTO	(RS-232C)	
Connection setting	ier connection USB ier connection RS-422 AUTO AUTO speed/port No. auton	(RS-232C)	
Connection setting Servo amplif Com. speed Port No. Search com.	ier connection USB ier connection RS-422 AUTO AUTO speed/port No. auton	(RS-232C)	MELSOFT MR Configurator2
Connection setting Servo amplif Com. speed Port No. Search com.	er connection USB ier connection RS-422 AUTO AUTO . speed/port No. auton	(RS-232C)	MELSOFT MR Configurator2
Connection setting Servo amplifi Servo amplifi Com, speed Port No, Search com. The last-used pro-	er connection USB ier connection RS-422 AUTO AUTO speed/port No. auton	(RS-232C)	MELSOFT MR Configurator2



5.2.4 Driver ON LINE Check Check that the driver is enabled (ONLINE). Image: Image:

When It is OFFLINE is is displayed as "

* For OFFLine, PC and amplifier aren't communicating. Confirm the following points.

- Is amplifier's power supply turned on?
- Is PC and amplifier LECSB connected with the USB cable?
- Is the USB driver installed?
- Is the USB driver which is compliant to correct Windows version installed?
- Is the setting of "Port" for USB connection correct?

5.2.5 Help Function

By selecting "MR Configurator2 Help" when "Help" is initiated from any window of the MR Configurator2[™] setup software, a "HELP" screen will be displayed.



5.3 Parameter setting (Driver side)

The setup software (MR Configurator2[™] SMC part No: LEC-MRC2E) is necessary for setting the parameter.

- *1 Setup software version 1.52E or above is required.
- *2 The setup software (MR Configurator2[™] SMC part No: LEC-MRC2E) must be purchased as an additional item.
- *3 The USB cable (LEC-MR-J3USB) must be purchased as an additional item.
- ① From the "Parameter" menu select "Parameter Setting", the "parameter setting" window will open.
- The explanation of the parameter item is displayed in "MR2 Help".
 (When it is not displayed, from the "View" menu select "Docking window" "Docking Help".)



③ When each item of "List display" is clicked, "Parameter list" screen along each item is displayed. When "Basic" is selected, it is displayed as follows.

Basic			Selected	Items Write Single	e Axis Write
No.	Abbr.	Name	Units	Setting range	Axis1
PA01	*STY	Control mode		0000-0F55	0000
PA02	*REG	Regenerative option		0000-71FF	0000
PA03	*ABS	Absolute position detection system		0000-0004	0000
PA04	*AOP1	Function selection A-1		0000-F031	0000
PA05	*FBP	Number of command input pulses per revolution		0-0 / 1000-50000	0
PA06	CMX	Elec. gear numerator (Cmd. pls. mult. factor num.)		1-1048576	1
PA07	CDV	Elec. gear denominator (Cmd. pls. mult. factor den.)		1-1048576	1
PA08	ATU	Auto tuning mode		0000-0003	0001
PA09	RSP	Auto tuning response		1-32	12
PA10	INP	In-position range	pulse	0-65535	100
PA11	TLP	Forward rotation torque limit	%	0.0-100.0	100.0
PA12	TLN	Reverse rotation torque limit	%	0.0-100.0	100.0
PA13	*PLSS	Command pulse input status		0000-0812	0000
PA14	*POL	Rotation direction selection		0-1	0
PA15	*ENR	Encoder output pulse	pulse/rev	1-1048576	4000
PA16	*ENR2	For manufacturer setting		0000-FFFF	0000
PA17	*MSR	For manufacturer setting		0000-FFFF	0000
PA18	*MTY	For manufacturer setting		0000-FFFF	0000
PA19	*BLK	Parameter block		0000-FFFF	000C

Refer to"LECSB Operation Manual", chapter 5 for details of each parameter.

5.3.1 Change of parameter block

To enable settings for all parameters.

- ① Select "Basic" tab and change "PA19" value to "000C".
- ② Click the "PA19" row then click "Selected Items Write".
- ③ Cycle the power for parameters for this driver to be enabled.

Basic			Selecte	d Items Write Single	e Axis Write
No.	Abbr.	Name	Units	Setting range	Axis1
PA01	*STY	Control mode		0000-0F55	0000
PA02	*REG	Regenerative option		0000-71FF	0000
PA03	*ABS	Absolute position detection system		0000-0004	0000
PA04	*AOP1	Function selection A-1		0000-F031	0000
PA05	*FBP	Number of command input pulses per revolution		0-0 / 1000-50000	0
PA06	CMX	Elec. gear numerator (Cmd. pls. mult. factor num.)		1-1048576	1
PA07	CDV	Elec. gear denominator (Cmd. pls. mult. factor den.)		1-1048576	1
PA08	ATU	Auto tuning mode		0000-0003	0001
PA09	RSP	Auto tuning response		1-32	12
PA 10	INP	In-position range	pulse	0-65535	100
PA11	TLP	Forward rotation torque limit	%	0.0-100.0	100.0
PA12	TLN	Reverse rotation torque limit	%	0.0-100.0	100.0
PA13	*PLSS	Command pulse input status		0000-0812	0000
PA14	*POL	Rotation direction selection		0-1	0
PA15	*ENR	Encoder output pulse	pulse/rev	1-1048576	4000
PA16	*ENR2	For manufacturer setting		0000-FFFF	0000
PA17	*MSR	For manufacturer setting		0000-FFFF	0000
PA 18	*MTY	For manufacturer setting		0000-EEEE	0000
PA19	*BLK	Parameter block		0000-FFFF	000C

④ Please click "Read".

Parameter Se	tting
Axis1 4.	🕂 Read 👸 Set To Default 😽 Verify 👖 Parameter Copy 📄 Parameter Block
Dpen 💾 Save A	is Paste Mundo Maredo

When changing of each parameter, note the following points.

- Note1) For various parameters, there is "Enable once by cycling the power after setting". (If you do not cycle the power, it does not register the data in the driver.)
- Note2) "Selected Items Write": It writes the specific parameter values of the corresponding frame to the driver. "Single Axis Write": It writes all of the parameters to the driver.
- Note3) Do not change "For manufacturer setting" parameters. If you change by these by mistake, it may cause the amplifier to not work properly.

5.3.2 Read of parameters

If you read the parameters of the driver to the software, please perform a "read" operation.

- From the View menu bar "parameter (A)" please click on the "parameter setting (P)". "Parameter Settings" screen will display.
- ② Please click on the "Read".

Parameter Setting 2		
🕴 🗖 Axis 1 🛛 🖌 🕂 Read 🖏 Set To Default 🌄 Verify	Parameter Copy	Parameter Block
Bopen Paste As Copy Paste Oundo MR	edo	
MELSOFT MR Configurator2		
Execute reading. Continue?		
はい(Y) いいえ(N)		

5.3.3 Parameter setting method

Please set the parameters for each actuator. Please change the parameter values according to usage.

Refer to "LECSB Operation Manual", chapter 5 for details of each parameter.

Refer to"LECSB Operation Manual (Simplified Edition)", section 5.3.4 for details of parameters recommended value of each actuator.

Setting example of the Control mode (PA01) (in the case of setting to "position control mode")

- ① Set the parameters of the PA01 to "0000" in the "Basic" tab.
- ② Click on the "Single Axis Write" button.
- ③ Turn the power OFF and ON again. The Parameter is then enabled.



5.3.4 The recommended parameters for each actuator

The recommended parameters for each actuator. Please change the parameter values in accordance with the user specification.

Refer to "LECSB Operation Manual", section 5 for details.

Recommended	Parameter	Values	(1 E E.
Recommended	raiametei	values	

	_			LEFS2	5	L	EFS32	2		LEFS40)
Series	Lead	symbol	Н	А	В	Н	А	В	Н	А	В
	Le	ead	20	12	6	24	16	8	30	20	10
Parameter *1,*2	Para. No.	Initial value				Recom	mende	d value			
Number of command input pulses per revolution *3	PA05	0	0								
Electronic gear numerator *3	PA06	1	32768								
Electronic gear denominator *3	PA07	1	250	150	75	300	200	100	375	250	125
Regenerative option	PA02	0000			0000((Non) / 00)02(LE	C-MR-R	B-032)		
Rotation direction selection *4	PA14	0			1	(+:Coun	iter mo	otors sid	le)		
Adaptive tuning mode	PB01	0000					0000				
Load to motor inertia moment ratio	PB06	7					7				
Machine resonance suppression filter 1	PB13	4500					4500				
Notch shape selection 1	PB14	0000					0000				

Different from the initial value.

*1 Parameter is the recommended value. Please change the parameter to make appropriate value for your operating method.

*2 A mechanical resonance may occur depending on the configuration or the mounting orientation of the transferred object. Please change the parameter in the initial setting.

(Parameter initial configuration \Rightarrow Set the recommended parameter value \Rightarrow Operation start)

*3 The travel distance of the actuator per 1 pulse should be 10 [μ m/pulse].

*4 When the motor mounting position is right side parallel (LEFS*R) or left side parallel (LEFS*L), the rotation direction selection is 0(+: Counter motors side).

			LEFB25	LEFB25U	LEFB32	LEFB32U	LEFB40	LEFB40U
Series	Lead	symbol			5	5		
	Le	ead			5	4		
Parameter *1,*2	Para. No.	Initial value			Recomme	nded value		
Number of command input pulses per revolution *3	PA05	0	0					
Electronic gear numerator *3	PA06	1	32768					
Electronic gear denominator *3	PA07	1	675					
Regenerative option	PA02	0000		0000(Non) / 0002((LEC-MR-RE	3-032)	
Rotation direction selection	PA14	0	1(+: Counter motors side)	0(+: Counter motors side)	1(+: Counter motors side)	0(+: Counter motors side)	1(+: Counter motors side)	0(+: Counter motors side)
★ Adaptive tuning mode	PB01	0000	00	02		00	00	
★ Load to motor inertia moment ratio	PB06	7			5	0		
★ Machine resonance suppression filter 1	PB13	4500	40	00		45	00	
★ Notch shape selection 1	PB14	0000	0030 0000					

Different from the initial value.

*1 Parameter is the recommended value. Please change the parameter to make appropriate value for your operating method. *2 A mechanical resonance may occur depending on the configuration or the mounting orientation of the transferred object. Please

change the parameter in the initial setting.

(Parameter initial configuration \Rightarrow Set the recommended parameter value \Rightarrow Operation start) *3 The travel distance of the actuator per 1 pulse should be 10 [µm/pulse].

Recommended Parameter Values [LEJ]

				LEJS40			LEJS63		LEJB40	LEJB40 LEJB63		
Series	Lead s	symbol	Н	А	В	Н	А	В	-	Т		
	Le	ad	24	16	8	30	20	10	27	42		
Parameter *1,*2	Para. No.	Initial value	Recommended value									
Number of command input pulses per revolution *3	PA05	0		0								
Electronic gear numerator *3	PA06	1			32	768			65536	32768		
Electronic gear denominator *3	PA07	1	300	200	100	375	250	125	675	525		
Regenerative option	PA02	0000		0000(N	on) / 000	2(LEC-M	R-RB-03	2) / 0003	(LEC-MR-RB	-12)		
Rotation direction selection	PA14	0		(+:	Counter	1 motors s	side)		(+:Counter	0 (+:Counter motors side)		
★Adaptive tuning mode	PB01	0000			00	000			0002	0000		
★Load to motor inertia moment ratio	PB06	7				7			5	50		
★Machine resonance suppression filter 1	PB13	4500		4500					400	4500		
★Notch shape selection 1	PB14	0000	0000 0030 0000									
									Parameter s	should be chang the initial va		

*1 Parameter is the recommended value. Please change the parameter to make appropriate value for your operating method.

*2 A mechanical resonance may occur depending on the configuration or the mounting orientation of the transferred object. Please change the parameter in the initial setting.

(Parameter initial configuration \Rightarrow Set the recommended parameter value \Rightarrow Operation start)

*3 The travel distance of the actuator per 1 pulse should be 10 [µm/pulse].

Recommended Parameter Values [LEY]

		-		LEY2 LEYG	5/ 25		LEY25D/ LEYG25D		LEY32/ LEYG32		L	EY32D. EYG32)/ D	
Series	Lead symbol		А	В	С	А	В	С	А	В	С	А	В	С
	Le	ead	12	6	3	12	6	3	20	10	5	16	8	4
Parameter *1,*2	Para. No	Initial value					Re	comme	nded	value				
Number of command input pulses per PA05 0 0 revolution *3 0 0 0														
Electronic gear numerator *3	PA06	1	327	768	65536	32768 65536		327	768	65536		32768		
Electronic gear denominator *3	PA07	1	150	75	75	150	75	75	250	125	125	200	100	50
Regenerative option	PA02	0000				000	0 (No	n)/ 0002	(LEC	-MR-	R <mark>B-0</mark> 32)			
Rotation direction selection *4	PA14	0	0 (+:Counter motors side)			1 (+:Counter motors side)			0 (+:Counter motors side)			1 (+:Counter motors side)		
Adaptive tuning mode	PB01	0000						00	00					
Load to motor inertia moment ratio	PB06	7						-	7					
Machine resonance suppression filter 1PB1345004500														
Notch shape selection 1	PB14	0000						00	00					

			LE	Y63	LEY63D						
	L	ead	А	В	С	L	А	В	С		
Series	Equivalent Lead (Including pulley ratio)		20	10	5	5(2.86) (Pulley ratio 4/7)	20	10	5		
Parameter *1,*2	Para. No	Initial value			Reco	ommended	value				
Number of command input pulses per revolution *3	PA05	0				0					
Electronic gear numerator *3	PA06	1	32768 65536 114688			32768		65536			
Electronic gear denominator *3	PA07	1	250	250 125		125	250	125	125		
Regenerative option	PA02	0000	00)00 (Non)/	0002 (LEC	-MR-RB-032	2)/ 0003 (L	EC-MR-RB	₹-RB-12)		
Rotation direction selection *4	PA14	0	(+:Counter	0 motors side	e)	1 (+:Counter motors side)				
Adaptive tuning mode	PB01	0000				0000					
Load to motor inertia moment ratio	PB06	7	7								
Machine resonance suppression filter 1	PB13	4500	4500								
Notch shape selection 1	PB14	0000				0000					

Different from the initial value.

*2 A mechanical resonance may occur depending on the configuration or the mounting orientation of the transferred object. Please change the parameter in the initial setting.

(Parameter initial configuration \Rightarrow Set the recommended parameter value \Rightarrow Operation start) *3 The travel distance of the actuator per 1 pulse should be 10 [µm/pulse].

*4 When the motor mounting position is on the right side parallel (LEY*R / LEYG*R) or left side parallel (LEY*L / LEYG*L), the rotation direction selection is 0(+: Counter motors side).

^{*1} Parameter is the recommended value. Please change the parameter to make appropriate value for your operating method.

5.3.5 Absolute position detection system

*If you use the absolute position detection system, it is necessary to prepare the I/O unit. Refer to "LECSB Operation Manual", chapter 14 for details.

If you use the ABS transfer by communication the absolute position detection system, set the parameter [PA03] to "0002".

Select the absolute position detection system

		Parameter	Initial	1.1.4.14	Setting	Co	Control mode	
No.	Symbol	Name	value	Unit	range	Position	Speed	Torque
PA03	*ABS	Absolute position detection system	0000h		Refer to the text.	0		

POINT

• Cycle the power off and then on again after setting the parameter to validate the parameter value.

Set this parameter when using the absolute position detection system in the position control mode.



Ex) When using ABS transfer by communicating the absolute position detection system. [PA03] = 0002

- ① Set the "PA03" to "0002" in the "Basic" tab.
- ② Click on the "Single Axis Write" button.
- ③ Turn the power OFF, and power on again. Parameter is enabled.

Basic			Selected	Items Write Single	Axis Write 2)
No.	Abbr.	Name	Units	Setting range	AXIS1	
PA01	*STY	Control mode		0000-0F55	0000	ก
PA02	*REG	Regenerative option		0000-71EE	0000	D
PA03	*ABS	Absolute position detection system		0000-0004	0000	
MELSC	Execute wr	eurator2 iting. Continue?			0002]
MELSO	OFT MR Conf	iguratu, 2 🔀				
G	Writing is f amplifier of	inished. Please switch the power supply of the if and on again.				
		ок				

5.3.6 Electronic gear

It is necessary to adjust the electric gear ratio to convert from the command pulse sent from the position unit to the travel amount of the electrical actuator.

For the recommended parameter for each actuator, refer to "LECSB Operation Manual (Simplified Edition)", section 5.3.4.

Please change the value of electronic gear by use of the customer.

(1) Set the parameter: [PA05], [PA06], [PA07] of LECSB driver.

		Parameter	Initial		Setting	Control mode		
No.	Symbol	Name	value	Unit	range	Position	Speed	Torque
PA05	FBP	Number of command input pulses per revolution	0		0 • 1000 to 50000	0		
PA06	СМХ	Electronic gear numerator (command pulse multiplying factor numerator)	1		1 to 1048576	0		
PA07	CDV	Electronic gear denominator (command pulse multiplying factor denominator)	1		1 to 1048576	0		

Set the value [PA05] to [PA07] are as follows.

• [PA05] = 0(Initial value) Initial value 0 correspond to "Number of command input pulses per revolution." 262144 [pulses/rev].
$ (PA06] \qquad [Number of command input pulses per revolution] \times P \times \frac{1}{1000} $
· [PA07] [Actuator lead L [mm]] × n1/n2
P: Travel amount per 1 command pulse [µm] n1/n2: Pulley ratio *1
Ex.) Travel amount per 1 command pulse (P=10µm) Actuator lead (L = 6mm) Pulley ratio (n1/n2 = 1/1)
$[PA05] = 0(Initial value)$ $[PA06] _ \frac{262144 \times 10 \times 1000}{1000}$

117,000	_	
[PA07]	-	6 × 1/1
[PA06]	_	262144×10
[PA07]	= -	6×1000
[PA06]	=	32768
[PA07]		75

*1 For pulley ratio, refer to Lead of "LECSB Operation Manual (Simplified Edition)", section 5.3.4. The actuator not described for pulley ratio is calculated by "1/1".

5.3.7 Control mode selection

- To use position control mode, navigate to the "Basic" tab of the "Parameter Setting" screen "Control mode selection" Please select "Position control mode".
 ("PA01" parameter in the "Basic" tab of the List display also changes to "0000".)
- ② Click on the "Single Axis Write" button.
- ③ Click OK.
- ④ Click OK. (After power OFF \rightarrow ON, the parameter is enabled.)



5.3.8 Set the parameter of command pulse input form

It is required to set the command input pulse form dependent on the upper unit pulse train when using the Position control mode (pulse input).

Input form (3 types)

- ① Forward rotation pulse train/Reverse rotation pulse train
- ② Pulse train/ Direction phase pulse train/B-phase pulse train
- ③ A-phase pulse train/ B-phase pulse train

·Logic (2 types)

- ① Positive logic
- ② Negative logic

• Input form (3 pulse types) × positive/negative logic (2 types) = 6 selectable types

In the upper level device (positioning module), there is a parameter which sets the output pulse form (mode). The form of the upper level device (positioning module) must be made "compatable" with the LECSA. If the forms are not compatable, the operation will not work correctly. Please be aware that depending on the upper level device (positioning module), the "command input pulse forms" above may not be available.

(1) Set the input configuration of the LECSB pulse train input signal.

Set parameter: [PA13]

		Parameter	Initial	Linit	Setting	Control mode		
No.	Symbol	Name	value	Unit	range	Position	Speed	Torque
PA13	PLSS	Command pulse input form	0000h	\searrow	Refer to the text.	0		\bigcirc

Select the input form of the pulse train input signal. Command pulses may be input in any of three different forms, for which positive or negative logic can be chosen.

Arrow \square or \square in the table indicates the timing of importing a pulse train.

A- and B-phase pulse trains are imported after they have been multiplied by 4.

Selection of command pulse input form

Setting		Pulse train form	Forward rotation command	Reverse rotation command
0010h		Forward rotation pulse train Reverse rotation pulse train		
0011h	Negative logic	Signed pulse train		
0012h		A-phase pulse train B-phase pulse train		
0000h		Forward rotation pulse train Reverse rotation pulse train		
0001h	Positive logic	Signed pulse train	PP_T_T_T_T_T_T_T_T_T_T_T_T_T_T_T_T_T_T_	
0002h		A-phase pulse train B-phase pulse train		

- EX.) To set the command pulse input configuration to pulse train + Symbol in a positive logic. [PA13] = 0001
- ① Set the "PA13" to "0001" in the "Basic" tab.
- ② Click on the "Single Axis Write" button.
- ③ Turn the power OFF and ON again. Parameter is enabled.

Parameter Setting							
🗖 Axis 1 🛛 🖌 📲 Re	ead 🐻	Set To Defau	IIt 🌄 Verify 🛅 Parameter Copy 📄 Parameter Block				
🔁 Open 💾 Save As 👔	Сору	Paste M	Undo 🚰 Redo	·	2		
Function display	Basic			Selecter	I Items Write	Axis Write	
Basic	No	Abbr	Namo	Unita	Sotting reaco		
Extension	PA01	*STV	Control mode	Units	Jetung Pige	0000	
Extension 2	PA02	*REG	Regenerative option		0000-01 33	0000	
Component parts	PA03	*ABS	Absolute position detection system		0000-0004	0002	
Position control	PA04	*AOP1	Function selection A-1		0000-E031	0000	
Speed control	PAOS	*EBP	Number of command input pulses per revolution		0-0 / 1000-50000	0000	
Torque control	PA06	CMX	Elec. gear numerator (Cmd. pls. mult. factor num.)		1-1048576	1	
Speed setting (Spee	PA07	CDV	Elec gear denominator (Cmd. pls. mult. factor den.)		1-1048576	1	
Servo adjustments	PA08	ATU	Auto tuning mode		0000-0003	0001	
Basic	PA09	RSP	Auto tuning risole		1-32	12	
Extension	PA 10	INP	In-position range	pulse	0-65535	100	
Gain changing	PA11	TIP	Enrward rotation torque limit	%	0.0-100.0	100.0	
Digital I/O					010 10010		
Analog input	PA13	*PLSS	Command pulse input status	70	0000-0812	0000	
I ist display	1 1120	1000			0000 0012		
Basic	PA15	*ENR	Encoder output pulse	pulse/rev	1-1048576	400	
Gain/filter	PA 16	*ENR2	For manufacturer setting	pulseriev	0000-EEEE	0000	
Extension	PA17	*MSR	For manufacturer setting		0000-EEEE	0000	0004
	PA 18	*MTY	For manufacturer setting		0000-EEEE	0000	0001
10	DA 10	*BLK	Parameter block		0000-FFFF	0000	
LSOFT MR Conf	iigura	tor2		Configurator	-2		
Execute w	riting.	Continue	2? Writ	ing is finished. I lifier off and on	Please switch the pov again.	ver supply of	the
latu (Y	5	เาเาสิ	L(N)				ок

5.3.9 Verify of parameters

If you want to compare the "parameter" set in the setup software with the " Parameters set in the driver" / "Initial value parameter" / "Saved parameter", perform " Verify ".

- ① Click the "Verify" button on the [Parameter Setting] window. "Verfication Setting" screen will display.
- Please select the comparison target.
 Amplifier : Compare with the parameters set in the driver.
 Default : Compare with the initial value of the parameter.
 File : Compare with saved parameters.
- ③ Please click "OK" button. The verified result is displayed.

	Parameter	Setting		1					
	Axis1	Read	Set To Default	Verify	Parameter	Copy 🗎 F	Parameter Block		
2	Verification	n Setting harget setting fier ③ Defaul	It O File						
	Verify								
	Axis1 No. Abb PA01 *STY	r. Control me	Name			Units	Value 0	Default 001	0000



5.3.10 Parameter initialization

If you want to initialize parameters in the driver, please perform "Set to Default". When you initialize the parameters, parameters can not be undone.

Please be sure to save the parameters in use.

(Refer to "LECSB Operation Manual (Simplified Edition)", section 5.7.1 for the parameter storage method.)

- ① Click the "Set To Default" button on the [Parameter Setting] window.
- Please click "Yes" button. "Parameter Block" screen will display.
 Set the default using an editable parameter as the browsable range of the selected parameter block.
- ③ Select the parameter block you want to initialize.
- Please click "OK" button.
 Set the default using an editable parameter as the browsable range of the selected parameter block.
- ⑤ Click on the "Single Axis Write" button.

© Turn the power OFF and ON again. Parameter is enabled.



5.4 JOG Mode in the Setup Software

- ① The "JOG Mode" window can be displayed by selecting "Jog Mode" from the "Test Mode" menu in the **setup software**.
- ② Click "OK".

(When using this function, all external input signal operation will be diabled. If controlling using a PLC or other upper device, please turn off the power and reset the device before use.)

MELSOFT MR Configurator2 New project	CONTRACTOR - TABLE - CONTRACTOR	
Project View Parameter Safety Positioning-data Monitor Diagnosis Test Mode Adjustment Too	xls Window Help	
🗅 🖻 💾 🖉 😨 🔚 🕫 🖉 🔣 🗮 🗱 🗰 🛱 🐚 📆 😗 🕻 🗤 🚺 JOG Mode		
106 Mode X		4 Þ 🗸
Motor-less Operation		
D0 Forced Output		
Program Operation		
Single-step Feed		
Test Mode Information		
JOG Mode		
Aviet N		
Setting		
Motor speed 200 😴 r/min		
(1-6500)		
Accel./decel. time constant 1000 😴 ms		
(0-50000)	MELSUFT MR Configure 72	
LSP, LSN auto ON		
	Once you start test mode, normal operation by external input	
Forward CCW Reverse CW Stop	signal will be invalid.	
Rotation only while the CCW or CW button is being pushed		
The SHIFT key can be used for forced stop.		
Open the JOG Operation window	[Station 00] MR-J3-A Servo amplifier connection: USB	OVR CAP NUM SCRL

5.4.1 JOG Mode

- In order to prevent accidental impact at the end of the stroke, test actuator operation at low speed. (If motor speed configuration or Acceleration/deceleration time are required, change the value.) See "LECSB Operation Manual (Simplified Edition)", section 5.6.2 for motor speed configuration. See "LECSB Operation Manual (Simplified Edition)", section 5.6.3 for Acceleration/deceleration time.
- Check actuator JOG operation using [Forward (CCW)] and [Reverse (CW)] in JOG mode. (If operation is not correct, please check wiring and parameters). When performing JOG operation in the setup software, the rotation direction of the actuator does not change if you change the setting of parameter PA14 (Rotation direction selection). The actuator moves in the direction of [Forward (CCW)] button and [Reverse (CW)] button.
- ③ If the selection "LSP and LSN are automatically turned ON" is not checked, an alarm will occur. (If checked, the stroke end signals (LSP & LSN) will be automatically turned ON when this window is open).

	JOG Mode
	Axis1
	Setting
1	Motor speed 200 😴 r/min
	(1-6900)
	Accel./decel. time constant 1000 💭 ms
<u>_</u>	
3	LSP, LSN auto ON
2	Forward CCW Reverse CW Stop Forced Stop
	Rotation only while the CCW or CW button is being pushed
	The SHIFT key can be used for forced stop.

Item	Setting range	Unit	Description
Motorspeed	0 ~ allowable actuator speed	r/min	Set the command speed of the servo motor for execution of positioning (motor rotations/minute).
Acceleration/de celeration time	0 ~ 50000	ms	Set the time until the servo motor reaches/stops to the rated speed (3000 r/min).

5.5 Changing I/O Signal Allocation

I/O signal assignment can be changed as appropriate from initial settings. There may be cases when changing to the Input/output signal assignment are required for actuator operation.

Please be aware that any changes will alter signals entered as initial settings.

Please allocate them according to your system specification.

*When configuring PD**, please set parameter write inhibit [PA19] to 000C.

See "LECSB Operation Manual", section 5.4 for details.

5.5.1 Automatic Input Signal ON Selection Parameter Configuration

Configure the input signal automatic ON selection parameter.

The parameter "PD01: Input signal automatic ON selection" settings, defines which input <u>signals will turn ON</u> <u>automatically when the control circuit power supply is turned on</u>., doing this allows <u>additional I/O signal selection</u> <u>range</u>.

Please allocate it according to your system specification.

Configure the automatic ON selection in parameter [PD01], or wire the I/O signal layout.

If I/O signal wiring layout is altered, do not configure PD01: Input signal automatic ON selection. (Ex.)If the servo-on(SON) is automatically turned on with PD01, the actuator will always be in the servo-on state when the control circuit power supply is turned on. Therefore, it is not possible to operate servo-on/servo-off from the I/O signal.

Please configure PD01: Input signal automatic ON selection in Hexadecimal (HEX).

During Actuator Operation: <Signals which must be ON during actuator operation>

Set PD01 as 0C04. The following signals	s will automatically turn on when power supply turns on.
Servo-on	OFF Sonvo-off

SON	Servo-on	OFF:Servo-off
		ON :Servo-on (operational)
LSP	Forward rotaion Stroke end	OFF: Forward rotaion Stroke end
	(normally closed contact)	ON : Forward rotaion Stroke end off (operational)
LSN	Reverse rotaion Stroke end	OFF: Reverse rotaion Stroke end
	(normally closed contact)	ON : Reverse rotaion Stroke end off (operational)

Note) In order to operate the actuator, EMG (Emergency stop) is required to be ON (operational) state. However, for EMG (Emergency stop) can not be forced to automatic ON set by the parameter, please make sure it is physically wired.



Ex) LSP, LSN and SON to be automatically turned ON, [PD01] = 0C04

Binary number -> Decimal / Hexadecimal

Bir	iary i	numb	er	Decimal	Hexadecimal
0	0 0 0 0		0	0	
0	0	0	1	1	1
0	0	1	0	2	2
0	0	1	1	3	3
0	1	0	0	4	4
0	1	0	1	5	5
0	1	1	0	6	6
0	1	1	1	7	7
1	0	0	0	8	8
1	0	0	1	9	9
1	0	1	0	10	A
1	0	1	1	11	В
1	1	0	0	12	С
1	1	0	1	13	D
1	1	1	0	14	E
1	1	1	1	15	F

* Enabling "Stroke end" (LSP, LSN) and "Servo-on" (SON) Signals

- ① Set to PD01 to 0C04 in the I/O tab.
- ② Select "Single Axis Write".
- ③ Cycle the power for the altered parameters to be enabled.

* In this configuration, the stroke end **(LSP, LSN)** and servo-on **(SON)** signals will be ON automatically when the power is turned ON.

Parameter Setting										
📕 Axis1 🛛 🖌 🕂 Ri	📕 Axis1 🗸 🚽 Read 🐻 Set To Default 🙀 Verify 👖 Parameter Copy 📄 Parameter Block									
Common	I/O			Selected	Items Write Single	e Axis Write				
Basic	No.	Abbr.	Name	Units	Setting range	AXIS1			~	
···· Extension	PD01	*DIA1	Input signal automatic ON selection 1		0000 /FFF	0000				
Extension 2	PD02	*DIA2	For manufacturer setting		0000-0020	0000				
Component parts	PD03	*DI1	Input signal device selection 1 (CN1-15)		0000000003F3F3F	00020202				
Position control	PD04	*DI2	Input signal device selection 2 (CN1-16)		0000-000-003F3F3F	00212100				
Speed control	PD05	*DI3	Input signal device selection 3 (CN1-17)		0.000000-003F3F3F	00070704		0C04		
- Torque control	PD06	*DI4	Input signal device selection 4 (CN1-18)		00000000-003F3F3F	00080805				
- Speed setting (Spee	PD07	*DI5	Input signal device selection 5 (CN1-19)		0000000-003F3F3F	00030303				
 Servo adjustments 	PD08	*DI6	Input signal device selection 6 (CN1-41)		0000000-003F3F3F	00202006				
···· Basic	PD09	*DI7	For manufacturer setting		0000000-00000000	00000000			=	
Extension	PD 10	*DI8	Input signal device selection 8 (CN1-43)		0000000-003F3F3F	00000A0A				
Gain changing	PD11	*DI9	Input signal device selection 9 (CN1-44)		0000000-003F3F3F	00000B0B				
···· Digital I/O	PD12	*DI 10	Input signal device selection 10 (CN1-45)		0000000-003F3F3F	00232323				
Analog input	PD13	*DO1	Output signal device selection 1 (CN1-22)		0000-3F3F	0004				
🖃 🥅 List display	PD14	*DO2	Output signal device selection 2 (CN1-23)		0000-3F3F	000C				
Basic	PD15	*DO3	Output signal device selection 3 (CN1-24)		0000-3F3F	0004				
Gain/filter	PD 16	*DO4	Output signal device selection 4 (CN ⁺ 25)		0000-3F3F	0007				
Extension	PD17	*DO5	For manufacturer setting		0003-0003	0003				
I/O	PD 18	*DO6	Output signal device selection of (CN1-49)		0000-3F3F	0002		L		
	PD 19	*DIF	Input filter setting		0000-2113	0002				
	PD20	*DOP1	Function selection D-1		0000-4011	0000				
	PD21	*DOP2	For manufacturer setting		0000-0011	0000				
	PD22	*DOP3	Function selection D-3		0000-0111	0000				
	PD23	*DOP4	For manufacturer setting		0000-0211	0000				
	PD24	*DOP5	Function selection D-5		0000-1111	0000		1	v	





5.5.2 Initial I/O Signal Allocation

The initial (Default) allocation of I/O signals is shown below.

PD03 to PD12 Input signal assignment (CN1-15 to CN1-19, CN1-41, CN1-43 to CN1-45) PD13 to PD18 Output signal assignment (CN1-22 to CN1-25, CN1-49)

Dovico	Sumbol	Connector	I/O	Parameters	Initial
Device	Symbol	pin No	division	No	value
Servo-on	SON	CN1-15	DI-1	PD03	00020202
- (Unallocation)	-	CN1-16	DI-1	PD04	00212100
Proportion control	PC	CN1-17	DI-1	PD05	00070704
External torque	TL	CN1-18	DI-1	PD06	00080805
limit selection					
Reset	RES	CN1-19	DI-1	PD07	00030303
Clear	CR	CN1-41	DI-1	PD08	00202006
Emergency stop	EMG	CN1-42	DI-1	- (fixed)	- (fixed)
Forward rotaion stroke end	LSP	CN1-43	DI-1	PD10	00000A0A
Reverse rotaion stroke end	LSN	CN1-44	DI-1	PD11	00000B0B
Control change	LOP	CN1-45	DI-1	PD12	00232323

Input signal points (10): (position control mode) and initial assignment

Output signal points (6) (position control mode) and initial assignment

Dovico	Symbol	Connector	I/O	Parameters	Initial
Device	Symbol	pin No	division	No	value
In-position	INP	CN1-22	DO-1	PD13	0004
Zero speed detection	ZSP	CN1-23	DO-1	PD14	000C
In-position	INP	CN1-24	DO-1	PD15	0004
Limiting torque	TLC	CN1-25	DO-1	PD16	0007
Trouble	ALM	CN1-48	DO-1	- (fixed)	- (fixed)
Ready	RD	CN1-49	DO-1	PD18	0002

See "LECSB Operation Manual", section 3.5 for details regarding signals. See "LECSB Operation Manual", section 5.4 for parameter configuration values.

5.5.3 Signal Allocation using Setup Software

- ① The "Parameter Setting" window will be displayed when "Parameter Setting" is selected from the "Parameter" menu in the setup software.
- Click the I/O tab.
- ③ When changing the allocation of signals, parameters for "PD03" "PD08", "PD10" "PD16" or "PD18" can be altered.

Parameter Setting							
Axis1 🗸 📢 🖪	ead 🐻	Set To Defau	It 😓 Verify 📑 Parameter Copy 📑 Parameter Block				
POpen PSave As	Сору	Paste M	Nundo Markedo				
Function display	I/7			Selected	Items Write Sin	ale Axis Maite	1
Basic (3)	No.	Abbr.	Name	Units	Setting range	Axis1	^
- Extension	PD01	*DIA1	Input signal automatic ON selection 1		0000-0FF	= 0000	
Extension 2	PD02	*DIA2	For manufacturer setting		0000-000	0000	
Component parts	PD03	*DI1	Input signal device selection 1 (CN1-15)		0000000-003F3F3	00020202	
Position control	PD04	*DI2	Input signal device selection 2 (CN1-16)		0000000-003F3F3	00212100	
Speed control	PD05	*DI3	Input signal device selection 3 (CN1-17)		0000000-003F3F3	00070704	
Torque control	PD06	*DI4	Input signal device selection 4 (CN1-18)		0000000-003F3F3	00080805	
Speed setting (Spee	PD07	*DI5	Input signal device selection 5 (CN1-19)		0000000-003F3F3	00030303	
🖃 Servo adjustments	PD08	*DI6	Input signal device selection 6 (CN1-41)		0000000-003F3F3	00202006	
Basic	PD09	*DI7	For manufacturer setting		0000000-0000000	00000000	=
- Extension	PD 10	*DI8	Input signal device selection 8 (CN1-43)		0000000-003F3F3	= 00000A0A	
Gain changing	PD11	*DI9	Input signal device selection 9 (CN1-44)		0000000-003F3F3	= 00000B0B	
Digital I/O	PD12	*DI 10	Input signal device selection 10 (CN1-45)		0000000-003F3F3	00232323	
Analog input	PD13	*DO1	Output signal device selection 1 (CN1-22)		0000-3F3	= 0004	
🖃 🥅 List display	PD14	*DO2	Output signal device selection 2 (CN1-23)		0000-3F3	= 000C	
Basic	PD15	*DO3	Output signal device selection 3 (CN1-24)		0000-3F3	= 0004	
Gain/filter	PD 16	*DO4	Output signal device selection 4 (CN1-25)		0000-3F3	= 0007	
Extension	PD17	*DO5	For manufacturer setting		0003-000	3 0003	
I/0	PD 18	*DO6	Output signal device selection 6 (CN1-49)		0000-3F3	= 0002	
	PD 19	*DIF	Input filter setting		0000-211	3 0002	
	PD20	*DOP1	Function selection D-1		0000-401	1 0000	
	PD21	*DOP2	For manufacturer setting		0000-001	1 0000	
	PD22	*DOP3	Function selection D-3		0000-011	1 0000	
	PD23	*DOP4	For manufacturer setting		0000-021	1 007.0	
<	PD 24	*DOP5	Function selection D-5		0000-111	1 5000	×

5.5.4 Allocation example (Position control mode)

(1) Example of Gain changing selection (CDP) Settings Changing pins CN1-16 to Gain changing selection (CDP).

Device	Symbol	Connector pin No	I/O division	Parameters No	Initial value	
Servo-on	SON	CN1-15	DL1	PD03	00020202	
 (Unallocation) 	-	CN1-16	DI-1	PD04	00212100	
, , , , , , , , , , , , , , , , , , ,						
Proportion control	PC	CN1-17	DI-1	PD05	00070704	Γ
External torque	TL	CN1-18	DI-1	PD06	00080805	Ĺ
limit selection						
Reset	RES	CN1-19	DI-1	PD07	00030303	Ĺ
Clear	CR	CN1-41	DI-1	PD08	00202006	Ĺ
Emergency stop	EMG	CN1-42	DI-1	- (fixed)	- (fixed)	ĺ
Forward rotaion	LSP	CN1-43	DI-1	PD10	00000A0A	Ĺ
stroke end						
Reverse rotaion	LSN	CN1-44	DI-1	PD11	00000B0B	Ĺ
stroke end						
Control change	LOP	CN1-45	DI-1	PD12	00232323	Ĺ

Device Servo on	Son	Connector pin No	I/O division	Parameters No	Initial value
Gain changing selection	CDP	CN1-16	DI-1	PD04	00212100→ 0021210D
Proportion control External torque limit selection	PC TL	CN1-17 CN1-18	DI-1 DI-1	PD05 PD06	00070704 00080805
Reset Clear	RES CR	CN1-19 CN1-41	DI-1 DI-1	PD07 PD08	00030303 00202006
Emergency stop Forward rotaion	EMG LSP	CN1-42 CN1-43	DI-1 DI-1	- (fixed) PD10	- (fixed) 00000A0A
stroke end Reverse rotaion	LSN	CN1-44	DI-1	PD11	00000B0B
stroke end Control change	LOP	CN1-45	DI-1	PD12	00232323

① Changing PD04 from 00212100 to 0021210D

No.	Symbol	Name and function
PD04	*DI2	Input signal device selection 2 (CN1-16) Any input signal can be assigned to the CN1-16 pin. The devices that can be assigned and the setting method are the same as in parameter No.PD03. O O D Select the input device Speed control mode of the CN1- 16 pin. Select the input device of the CN1- 16 pin.

Cotting	Control modes (Note 1)					
Setting	Р	S	Т			
00			/			
01	For manuf	acturer settin	g (Note 2)			
02	SON	SON	SON			
03	RES	RES	RES			
04	PC	PC				
05	TL	TL				
06	CR		/			
07		ST1	RS2			
08		ST2	RS1			
09	TL1	TL1	/			
0A	LSP	LSP				
0B	LSN	LSN	/			
0C	For manuf	acturer settin	g (Note 2)			
0D	CDP					
0E to 1F	For manuf	acturer setting (Note 2)				
20		SP1	SP1			
21		SP2	SP2			
22		SP3	SP3			
23	LOP	LOP	LOP			
24	CM1					
25	CM2					
26	/	STAB2	STAB2			
27 to 3F	For manufa	For manufacturer setting (Note 2)				

Note 1. P: Position control mode

S: Speed control mode

T: Torque control mode

2. For manufacturer setting. Never set this value.

(2) Symbol allocation using the setup software:

Changing pins CN1-16 to Gain changing selection (CDP).

- ① Change PD04 from 00212100 to 0021210D in the I/O tab.
- ② Select "Single Axis Write".
- ③ Cycle the power the parametersto be enabled.

Act Image: Set To Default: Buy Verify The meeter Block Image: The Set Abs The Set Abs The Set Abs Control Image: The Set Abs The Set Abs Control Contro Contro Control Contr	Parameter Setting									
Control registry Control registry Control registry Control registry Back Wo	📕 Axis1 🛛 🖌 📲 R	ead 🚺	Set To Defa	ult 🌄 Verify 👖 Parameter Copy 📄 Parameter Block						
United deplay Vis Sector Sec	Dpen Pave As	Сору	Paste M	Undo MRedo		2				
Decision No. Abor. Issue Units Setting or multification No.1 Decision PODI TOLA Input signal automatic (M) selection 1 1 100.6777 00000 00000 00000 00000 00000 00000 00000 00000 000000 000000 000000 000000 000000 000000 000000 000000 000000 0000000 0000000 0000000 0000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 000000000 000000000 000000000 000000000 0000000000000000 000000000000000000000000000000000000	Function display	I/O			Selected	Items Write Single	e Axis Write			
Interson ODD Dial Dial <thdial< th=""> Dial <thdial< th=""> <t< td=""><td>Basic</td><td>No</td><td>Abbr</td><td>Name</td><td>Unite</td><td>Setting range</td><td>A WIN</td><td></td></t<></thdial<></thdial<>	Basic	No	Abbr	Name	Unite	Setting range	A WIN			
University Dist 2020 TUL2 For manufacture setting 000000000000000000000000000000000000	Extension	PD01	*DIA1	Input signal automatic ON selection 1	onno	00OFFF	0000	-		
Component parts 2003 T01 Prot signal divice selection 2 (VII-10) Speed acting 0 (VII-10) 2005 T013 Prot signal divice selection 2 (VII-10) 2000000-0037757 00000000 2007 T05 Prot signal divice selection 2 (VII-10) 2000000-0037757 00000000 2007 T05 Prot signal divice selection 2 (VII-10) 2000000-0037757 00000000 2009 T015 Prot signal divice selection 2 (VII-10) 2000000-0037757 00000000 2000000-0037757 00000000 2000000-0037757 00000000 20000000000000000000000000000	Extension 2	PD02	*DIA2	For manufacturer setting		2000-0000	0000			
Poston control PO04 PD22 Ipost signal device selection 3 ((11):1) Ipost signal device selection 3 ((11):1) Second control PO05 TD14 Ipost signal device selection 3 ((11):1) 0000000-003757 0000000-003757 Second control PO05 TD14 Ipost signal device selection 3 ((11):1) 0000000-003757 0000000-003757 Second control PO05 TD15 Ipost signal device selection 3 ((11):1) 0000000-003757 0000000-003757 Second control PO05 TD15 Ipost signal device selection 3 ((11):4) 00000000-003757 0000000-003757 Second control PO10 TD10 Ipost signal device selection 3 ((11):4) 00000000-003757 00000000-003757 Do10 TD10 Diput signal device selection 3 ((11):4) 00000000-003757 0000000-003757 Basic PO15 TD100 Diput signal device selection 3 ((11):4) 00000000-003777 0000000-003777 Basic PO10 TD100 Diput signal device selection 3 ((11):4) 000000000000000000000000000000000000	Component parts	PD03	*DI1	Input signal device selection 1 (CN1-15)		00002,00-003F3F3E	00000000			
Speed ontrol PODS POI POI style POI st	Position control	PD04	*DI2	Input signal device selection 2 (CN1-16)		02.00000-003 <f3f< td=""><td>00212100</td><td></td></f3f<>	00212100			
Torque control PO06 P014 Input signal device selection 3 (VII-18) O000000-0037373 O0000000 Service adjustments PO08 PO18 Druct signal device selection 5 (VII-19) O0000000-00373737 O0000000 Service adjustments PO18 Druct signal device selection 6 (VII-19) O0000000-00373737 O0000000 Service adjustments PO18 Druct signal device selection 8 (VII-19) O000000-00373737 O0000000 Service adjustments PO11 PO11 DO11 Druct signal device selection 10 O000000-0037377 O0000000 Service adjustments PO11 PO12 DO10 Druct signal device selection 10 O00000-0037377 O0000000 Analog input PO12 DO10 Druct signal device selection 10 O00000-0037377 O0000000 D00000000 D00000000 D000000000 D000000000000000000000000000000000000	- Speed control	PD05	*DI3	Input signal device selection 3 (CN1-17)		0000000-003F3F5F				
Speed setting (Speed Berrow adjustments) PO000000-00375757 PO000000-00375757 PO000000-00375757 PO000000-000375757 PO00000-000375757 PO0000-000375757 PO000000-000375757 PO0000-000375757 <td>- Torque control</td> <td>PD06</td> <td>*DI4</td> <td>Input signal device selection 4 (CN1-18)</td> <td></td> <td>00000000-003F3F3F</td> <td>00080805</td> <td></td>	- Torque control	PD06	*DI4	Input signal device selection 4 (CN1-18)		00000000-003F3F3F	00080805			
Serve adjustments PD6 Typut signal device selection 5 (N1-41) 0000000-003FFFF 0000000-003FFFF - Startinson PD10 TD8 Input signal device selection 8 (N1-43) 0000000-003FFFF 000000-003FFFF 000000-003FFFF 0000000-003FFFF 0000000-003FFFF 0000000-003FFFF 0000000-003FFFF 0000000-003FFFF 0000000-003FFFF 0000000-003FFFF 0000000-003FFFF 0000000-003FFFF 000000-003FFFF 00000-003FFFF 00000-003FFFF 00000-003FFFF 00000-003FFFF 00000-003FFFF 0000-003FFFF 0000-003FFFF 0000-003FFFF 0000-003FFFF 0000-003FFFF 0000-003FFFF 00000-003FFFF 0000-003FFFF	Speed setting (Spee	PD07	*DI5	Input signal device selection 5 (CN1-19)		0000000-003F3F3F	00030303			
Basic PO09 D17 For manufacture setting 0000000-0037575 Ocean changing PD11 D19 Input signal device selection 9 (CN1-47) 0000000-0037575 0000000-0037575 Option 10 /0 PD13 'D01 Output signal device selection 1 (CN1-22) 000000-0037575 000000-0037575 PD14 'D01 Output signal device selection 1 (CN1-22) 00000-0037575 00000-7575 Basic PD15 'D03 Output signal device selection 1 (CN1-22) 0000-7575 0000-7575 Basic PD15 'D03 Output signal device selection 1 (CN1-23) 0000-7575 0000-7575 Basic PD15 'D03 Output signal device selection 3 (CN1-49) 0000-7575 0000-7575 JO PD15 'D06 Output signal device selection 3 (CN1-49) 0000-7575 0000-7575 JO PD15 'D06 Output signal device selection 5 (CN1-49) 0000-7575 0000-7575 JO PD05 For manufacture setting 'D0000-0037575 0000-7037575 0000-7037575 JO PD05 For manufacture setting<	 Servo adjustments 	PD08	*DI6	Input signal device selection 6 (CN1-41)		0000000-003F3F3F	00202006			
Extension P0.0 T08 Input signal device selection 9 (CN1-49) 0000000-0037575 0000000 Organization P0.1 T010 Input signal device selection 10 (CN1-49) 0000000-0037575 0000000 Object P0.1 T010 Input signal device selection 10 (CN1-49) 0000000-0037575 0000000 Posic P0.1 T010 Input signal device selection 10 (CN1-49) 0000000-0037575 000000 P0.1 T010 Unput signal device selection 10 (CN1-49) 000000-0037575 000000 P0.1 T010 Unput signal device selection 10 (CN1-49) 00000-97575 00000-97575 P0.1 T015 T00-0 Output signal device selection 10 (CN1-49) 00000-97575 00000-97575 P0.1 T015 T010 Output signal device selection 10 (CN1-49) 00000-97575 00007 P0.1 T015 T010 Output signal device selection 10 (CN1-49) 00000-97575 00002 P0.1 T005 For manufactures setting 00000-0111 0000 0000 P0.1 To02 To02 For	···· Basic	PD09	*DI7	For manufacturer setting		0000000-00000000	00000000	i		
Gan changing PD11 TD19 Input signal device selection 19 (CN1+49) 0000000-00373757 0000000-00373757 00000000-00373757 00000000-00373757 00000000-00373757 0000000-00373757 0000000-00373757 0000000-00373757 0000000-00373757 0000000-00373757 0000000-00373757 0000000-00373757 0000000-00373757 000000-000373757 0000000-000373757 0000000-000373757 0000000-000373757 0000000-000373757 0000000-000373757 0000000-000373757 00000000-000373757 000000000000000000000000000000000000	Extension	PD 10	*DI8	Input signal device selection 8 (CN1-43)		00000000-003F3F3F	00000A0A			
Optical I/O PD12 TD110 Imput signal device selection 10 (CN1-45) 00000000373787 00223233 Imput signal device selection 10 (CN1-23) 0000-375787 <td> Gain changing</td> <td>PD11</td> <td>*DI9</td> <td>Input signal device selection 9 (CN1-44)</td> <td></td> <td>0000000-003F3F3F</td> <td>00000B0B</td> <td></td>	Gain changing	PD11	*DI9	Input signal device selection 9 (CN1-44)		0000000-003F3F3F	00000B0B			
Analog input PD13 DD1 Output signal device selection 2 (N1:23) 0000-375F 0000 Basic PD15 DD2 Output signal device selection 3 (N1:21) 0000-375F 0000 Basic PD15 DD2 Output signal device selection 3 (N1:21) 0000-375F 0000 Basic PD15 DD26 Output signal device selection 4 (Pd:25) 0000-375F 0000 Basic PD16 DD06 Output signal device selection 4 (Pd:25) 0000-375F 0000 Basic PD16 DD06 Output signal device selection 1 (Pd:25) 0000-375F 0000 PD17 PD05 For manufacture setting 0000-375F 0000 0000 PD17 PD17 Input filter setting 0000-375F 0000-2113 0000 PD17 PD1	Digital I/O	PD12	*DI 10	Input signal device selection 10 (CN1-45)		0000000-003F3F3F	00232323			
Image: Bit dig/sy P014 D02 Output signal device selection 3 (VL12) 0000-375F 0000 Gain/filter P016 D004 Output signal device selection 4 (VL25) 0000-375F 0000 L/D P016 D005 Output signal device selection 4 (VL25) 0000-375F 0000 L/D P016 D005 Output signal device selection 4 (VL25) 0000-375F 0000 L/D P016 D005 Output signal device selection 4 (VL25) 0000-375F 0000 L/D P016 D05 Por manufacture setting 0000-0000 0000	Analog input	PD13	*DO1	Output signal device selection 1 (CN1-22)		0000-3F3F	0004			
Basic PD15 TOO3 Output signal device selection 3 (CNL39) 00003-373F 00001 U Uput signal device selection 4 (CNL39) 00003-373F 00001 00001-373F 00001 U U Uput signal device selection 6 (CNL39) 00000-373F 00001 00001-373F 00001 U D15 TOO 6 Output signal device selection 6 (CNL49) 00000-373F 00001 D10 TOO 6 Output signal device selection 6 (CNL49) 00000-373F 00001 D10 TOO 6 Output signal device selection 7 (CNL49) 00000-373F 00001 D10 TOO 1 Truction selection D1 00000-0011 00001 D101 TOO 2 For manufacture setting 00000-0011 00001 D102 TOO 2 For manufacture setting 00000-0011 00000 D102 TOO 2 For manufacture setting 00000-0011 00000 D102 TOO 2 For manufacture setting 0000-0011 00000 D102 TOO 2 For manufacture setting 0000-0111	E EList display	PD14	*DO2	Output signal device selection 2 (CN1-23)		0000-3F3F	000C			
Clain/Inter PD Is TOO 4 Output signal device selection 1 (12-25) 00003-393 0007 J/O PD IS TOO 6 Output signal device selection 6 (CN1-49) 00003-2013 00002 PD IS TOO 6 Output signal device selection 6 (CN1-49) 00003-2013 00002 PD IS TOO 7 Function selection 10 00000-2013 00000 PD IS TOO 7 Function selection 10 00000-0011 0000 PD IS TOO 7 Function selection 0.5 00000-0111 0000 PD IS TOO 7 Function selection 0.5 00000-0111 0000 PD IS Function selection 0.5 00000-0111 0000 PD IS Function selection 0.5 0000-0111 0000 PD IS Function selection 0.5 0000-0111 0000 MELSOFT MR Configurator 2 If the selection 0.5 0000-1111 0000 If the visual selection 0.5 UVI IS (N) UVI IS (N) 0000-1111 0000	Basic	PD15	*DO3	Output signal device selection 3 (CN1-4)		0000-3F3F	0004			
Extension P11/2005 Pormanuature setting 00033003 P018 D006 Output signal device setting 0000-2113 0002 P019 DDF1 Function setection D 0000-2113 0002 P021 DOP2 For manufacture setting 0000-2113 0002 P021 DOP2 For manufacture setting 0000-0011 0000 P022 DOP3 Function setection D-3 0000-0111 0000 P022 DOP4 For manufacture setting 0000-0111 0000 P023 DOP4 For manufacture setting 0000-0111 0000 P024 DOP5 Function setection D-5 0000-1111 0000 P024 DOP5 Function setection D-5 0000-1111 0000 P024 DOP5 Function setection D-5 0000-1111 0000 Idtv(Y) UU-3(N) UU-3(N) UU-3(N) UU-3(N) UU-3(N) MELSOFT MR Configurator2 Idtv(Y) UU-3(N) Idtv(Y) UU-3(N) UU-3(N) Writ	Gain/filter	PD16	*D04	Output signal device selection 4 (C 1-25)		0000-3F3F	0007			
Image: Second conductive sectors (CN1-49) 0000-3-3-2000 0002 PD19 "PD1 Function selection D 0000-4011 0000 PD21 "PD00 Topol Function selection D-3 0000-4011 0000 PD21 "PD00 Topol Function selection D-3 0000-4011 0000 PD23 "PD00 Topol Function selection D-3 0000-4011 0000 PD24 "PD00 Function selection D-3 0000-111 0000 PD24 "PD00 Function selection D-3 0000-1111 0000 Image: Continue? Image: Continue? </td <td>Extension</td> <td>PD17</td> <td>*005</td> <td>For manufacturer setting</td> <td></td> <td>0003-0003</td> <td>0003</td> <td></td>	Extension	PD17	*005	For manufacturer setting		0003-0003	0003			
PD3 "DD0"1 Function selection D. 0000-211 0000 PD3 "DD0"1 Function selection D.3 0000-011 0000 PD3 "DD0"4 Function selection D.3 0000-011 0000 PD3 "DD0"4 Function selection D.3 0000-011 0000 PD3 "DD0"4 Function selection D.5 0000-011 0000 PD3 "DD0"5 Function selection D.5 0000-0111 0000 PD3 "DD0"5 Function selection D.5 0000-0111 0000 PD3 "DD0"5 Function selection D.5 0000-0111 0000 PD4 Function selection D.5 0000-0111 0000 MELSOFT MR Configurator2 (dt)	1/0	PD18	*006	Output signal device selecter 76 (CN1-49)		0000-3F3F	0002			
PD21 DOP2 For manufacture string 0000-0011 0000 PD22 DOP3 Function selection D-3 0000-0011 0000 PD23 DOP4 For manufacture string 0000-0011 0000 PD24 DOP5 Function selection D-3 0000-0011 0000 PD24 DOP5 Function selection D-3 0000-0011 0000 PD24 DOP5 Function selection D-5 0000-1111 0000 PD24 DOP5 Function Selection D-5 0000-1111 0000 PD24 DOP5 Function Selection D-5 0000-1111 0000 MELSOFT MR Configurator2 Image: Selection D-5 Image: Selection D-5 0000-1111 0000 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 0000-1111 0000 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5 Image: Selection D-5		PD 19	*DOD1	Input filter setting		0000-2113	0002			
Image: Point of the end		PD20	*DOP1	Function selection D		0000-4011	0000			
PD23 PD074 Por manufacturer setting 0000-0211 0000 PD24 PD0P5 Function Selection D-S 0000-1111 0000 MELSOFT MR Configurator2 Image: Continue? Image: Continue? Image: Configurator2 Image: Continue? Image: Continue? Image: Configurator2 Image: Continue? Image: Configurator2 Image: Continue? Image: Configurator2 Image: Continue? Image: Configurator2 Image: Configurator2 Image: Configurator2 Image: Configurator2 <td></td> <td>PD21</td> <td>*DOP2</td> <td>Function selection D-3</td> <td></td> <td>0000-0011</td> <td>0000</td> <td></td>		PD21	*DOP2	Function selection D-3		0000-0011	0000			
MELSOFT MR Configurator? (±い(Y) (±い(Y) (±い(Y) (±u(Y) (±u(Y) (±u(Y) (±u(Y) (±u(Y) (±u(Y) (±u(Y)) (±u(Y		PD22	*DOP4	For manufacturer setting		0000-0111	0000			
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MELSOFT MR Configurator2	MELSOFT MR Configurator2									
OK D	MELSOFT MR Configurator2									

- * Please allocate pins CN1-16 separately.
- * See "LECSB Operation Manual", section 5.4.2 for details on allocation of Input signals to pins CN1-15 CN1-19, CN1-41, CN1-43 CN1-45.
- * See "LECSB Operation Manual", section 5.4.2 for details on allocation of Output signals to pins CN1-22 CN1-25, CN1-49.

5.5.5 I/O Signal Allocation Check

The ON/OFF state (including layout check) and signal names allocated to CN1 can be checked. When parameters for PD03 – PD08, PD10 – PD16 or PD18 have been changed, it is necessary to confirm these are correctly assigned.

① From the Monitor menu of the Setup Software select I/O Monitor. The I/O Monitor window opens.



Ex) Position mode

5.6 Positioning Mode in Setup Software

- ① From the Test Mode menu of the Setup Software select Positioning Mode. The Move Distance Unit Selection window opens.
- ② Check Command pulse unit (Electronic gear valid) and click OK. Electronic gear ratio that is set in the PA05 / PA06 / PA07 is enabled.

③ Click OK.

(When using this function, external input signal operation will be disabled. When controlling from a PLC or upper level device, the power must be turned off and then on.)

④ The Positioning Mode window opens.

MELSOFT MR Configurator2 New project		
Project View Parameter Safety Positioning-data Monitor Diagnosis Test Mode Adjustment Tools Window	Help	
[🗅 🖻 💾 / 김 👔 🌆 😓 / 總 🖏 🐠 🏹 🕼 📆 🌚 🛱 🖉 🐨 🐨 🕼	1	
Positioning Mode		4 4 -
Jotor-less Operation		
DO Forced Output		
Program Operation		
Move Distance Unit Selection		
je Information		
Calact the move distance unit for perificing exercises		
Select the move distance unit for positioning operation.		
 Command pulse unit (Electronic gear valid) 	Positioning Mode	- I I 🛛
	Axis1 🗸	
C Encoder pulse unit (Electronic gear invalid)		Make the repeated operation valid
	Motor speed 200 荣 r/min	Repeat pattern Fwd, rot, (CCW)->Rev, rot, (CW)
	(1-6900)	
	time constant (0-50000)	Dwell time 2.0 📚
	Move distance (Cmd. pulse unit) 262144 🐑 pulse	(0,1-50,0)
MELSOFT MR Configurator?	(0-2147483647)	(1-9999)
	LSP, LSN auto ON	Make the aging function valid
	Z-phase signal movement	
Once you start test mode, normal operation of external input	Command pulse unit (Electronic gear valid)	Operating status: Stop
signal will be invalid.	Encoder pulse unit (Electronic gear invalid)	Operation count: times
	Porward CCW Reverse CW	P Forced Stop
	Pause	
	The SHIFT key can be used for forced stop.	
(<)	III	>

5.6.1 Positioning Mode

- In order to prevent accidental impact at the end of the stroke, operate the actuator at a low speed initially. When changing speed or movement, increase the values whilst checking operation (Change motor speed, acceleration/deceleration time, movement distance values if required).
 See "LECSB Operation Manual (Simplified Edition)", section 5.6.2 for motor speed configuration.
 See "LECSB Operation Manual (Simplified Edition)", section 5.6.3 for acceleration/deceleration time configuration.
 See "LECSB Operation Manual (Simplified Edition)", section 5.6.4 for movement distance configuration.
 See "LECSB Operation Manual (Simplified Edition)", section 5.6.4 for movement distance configuration.
 Actuator positioning operates using [Forward (CCW)] and [Reverse (CW)].
 (Check wiring and parameters if operation cannot be performed correctly)
 When performing JOG operation in the setup software, the rotation direction of the actuator does not change if you change the setting of parameter PA14 (Rotation direction selection). The actuator moves in the direction of [Forward (CCW)] button and [Reverse (CW)] button.
- Check the command impulse unit (electronic gear enabled).
 The electronic gear duty set to PA05/PA06/PA07 will be enabled.

See "LECSB Operation Manual (Simplified Edition)", section 5.3.4 – "Parameter Values by Actuator Model" for PA05/PA06/PA07 settings for each actuator.

If PA05/PA06/PA07 are set to the values in "LECSB Operation Manual (Simplified Edition)", section 5.3.4– Parameter Values by Actuator Model, the travel distance of the actuator per 1 pulse will be calculated as follows.

```
• travel distance of the actuator per 1 pulse = 10[\mu m] (0.01[mm])
```

③ If the "Stroke-end" (LSP, LSN) signal is not configured as ON, an alarm may occur. (When checked, the "stroke-end" (LSP, LSN) will be automatically turned ON only when this window is open.)

Í	Positioning Mode	
	Axis1	
D	Motor speed 1500 🐑 r/min (1-6900)	Make the repeated operation valid Repeat pattern Fwd. rot. (CCW)->Rev. rot. (CW)
	Accel./decel. 133 💭 ms time constant (0-50000)	Dwell time
	Move distance (Cmd. pulse unit) 262144 🐑 pulse (0-2147483647)	Operation count 1 文 times
4)	LSP, LSN auto ON Z-phase signal movement	Make the aging function valid
3	Move distance unit selection Ocommand pulse unit (Electronic gear valid)	Operating status: Stop
	O Encoder pulse unit (Electronic gear invalid)	Operation count: times
2)	Forward CCW	Stop Forced Stop
	Pause	
	The SHIFT key can be used for forced stop.	

Item	Setting range	Unit	Description
Matana	0 ~ Allowed Speed for		Set the command speed of the servo motor for execution of positioning
Motorspeed	each actuator	r/min	(Motor rotations/min).
Acceleration/de	ation/de		
celeration time		ms	Set the time until the servo motor reaches/slows to the rated speed (3000 f/min)
Move distance	0 ~ 2147483647	pulse	Sets movement distance.



5.6.2 Motor speed Configuration

<Rotation Speed Configuration>

Motor speed (r/min) configuration.
 * r/min (rpm): Indicated motor rotation speed (motor rotations/min)

Rotation speed must be between 0 and the allowable speed limit for each actuator. Please be aware that the actuator will not operate if this is set to 0.

If the rotation speed is too low, this may cause vibration; check the actuator while changing settings.

Movement speed (mm/s) must be converted into rotation speed (r/min). See below for the conversion formula.

Calculating motor speed conversion exa speed.	ample using ar	n actuator with	a 20mm lead and 500	[mm/sec]				
	Rotations	per Second						
Distance of movement per	second ÷	Distance of n	novement per rotation					
Rotation Speed (rpm) = Speed (mm/s) ÷ Lead (mm) }×60 (S) = {500 (mm/s) ÷20 (mm) }×60 (s) =1500 (rpm)								

Motor speed	1500 😴 r/min (1-6900)	Make the repeated operation val	id Lev. rot. (CW)
Accel./decel. time constant	1000 🐑 ms (0-50000)	Dwell time	2.0 🔷 s
Move distance (Cmd. pulse unit)	262144 会 pulse (0-2147483647)	Operation count	(U,1-5U,U) 1 🔷 times
LSP, LSN auto	ON		(1-9999)
Z-phase signal	movement	Make the aging function valid	
Move distance unit s	election	Operating status:	00
 Command puls 	e unit (Electronic gear valid)	Operating status.	
O Encoder pulse	unit (Electronic gear invalid)	Operation count:	times
Forward CCW	Reverse CW	Stop Forced Stop	

5.6.3 Acceleration/deceleration Time Configuation

< Acceleration/deceleration Time Configuration>

 Acceleration/deceleration time (ms) configuration: The acceleration/deceleration time sets the amount of time (ms) in which a prescribed number of rotations (3000[r/min]) is reached. The acceleration/deceleration time must be set to a value between 0 and the allowable acceleration/deceleration speed for each actuator.

The acceleration/deceleration time must be converted from the acceleration/deceleration speed. See below for the conversion formula.

Calculating Acceleration/deceleration conversion example using an actuator with a 8 [mm] lead with an acceleration of 3000[mm/sec²].

Speed at a rated motor rotation of 3000rpm

Accel/decel time (ms) = {Rated Rotation Speed (r/min) ÷60 (S) }× Screw Lead (mm) × 1000 * Acceleration/deceleration speed (mm/s²)

*Acceleration speed is measured in ms, so this must be calculated as (s) ×1000

Acceleration/deceleration time (ms) = $\frac{3000 (r/min) \div 60 (S)}{3000 (mm/s^2)}$ = 133 (ms)

Maha	Make the repeated operation valid	
(1-	6900) Repeat pattern Fwd. rot. (CCW)->Rev. rot. (CW)	~
Accel./decel. 133 💭 time constant (0-5	ms Dwell time 2.0 🔅 s	
Move distance 0 (Cmd. pulse unit) (0-214748	(0,1-50,0) pulse Operation count 1 times (1-9999)	
LSP, LSN auto ON	(1.9999)	
Z-phase signal movement		
 Move distance unit selection Command pulse unit (Electronic gear valid) 	Operating status: Stop	
O Encoder pulse unit (Electronic gear invalid)	Operation count: times	
Forward CCW	Stop Forced Stop	

5.6.4 Move distance Configuration and Operation

< Move distance Configuration>

① Set the move distance [pulse]. Select a value within the stroke range.

② Actuator position will operate using [Forward (CCW)], [Reverse (CW)]. The position at which power is turned ON will be set as the home position, and the actuator will travel the amount set as move distance (check wiring and parameters If operation is not performed correctly). When performing JOG operation in the setup software, the rotation direction of the actuator does not change if you change the setting of parameter PA14 (Rotation direction selection). The actuator moves in the direction of [Forward (CCW)] button and [Reverse (CW)] button.

- ③ Check command input pulse units (electronic gear enabled). The electronic gear ratio configured in PA05/PA06/PA07 will be enabled. See "LECSB Operation Manual (Simplified Edition)",section 5.3.4 for setting values for PA05/PA06/PA07 in each actuator. If parameters PA05/PA06/PA07 are set according to "LECSB Operation Manual (Simplified Edition)",section 5.3.4, the travel distance of the actuator per 1 pulse will be as follows.
- travel distance of the actuator per 1 pulse = $10[\mu m] (0.01[mm])$

Travel distance (mm) must be converted to travel distance (pulse). See below for the conversion formula.

As an example, for a travel of 100m;

Travel distance of the actuator per 1 pulse = 0.01 (mm) *1 100 (mm)/0.01 (mm) = 10000 (pulse)

- ④ If the stroke end signals (LSP, LSN) are not turned ON, an alarm may occur. (If checked, the stroke end (LSP, LSN) signals will be turned ON automatically only when this window is open).
 - * Ensure that the [Forward (CCW)] and [Reverse (CW)] driving directions are checked. If the driving direction is unclear, operate the actuator slowly with a small move distance while checking the driving direction.

	Positioning Mo	de		_ 🗆 🔀
	Axis1			_
	Motor speed	1500 会 r/min (1-6900)	Make the repeated operation valid Repeat pattern Fwd. rot. (CCW)->Rev. rot. (CV	V) 🗸
ന	Accel./decel. time constant	133 🐑 ms (0-50000)	Dwell time	s
	Move distance (Cmd. pulse unit)	10000 🐑 pulse	Operation count	יי times
4	LSP, LSN auto	ON Il movement	Make the aging function valid	
3	Command pulse	selection se unit (Electronic gear valid) e unit (Electronic gear invalid)	Operating status: Stop Operation count:	times
2	Forward CCW	C Reverse CW	Stop	
	The SHIFT key can be	used for forced stop.		

^{*1} The travel distance of the actuator per 1 pulse is set according to the electronic gears (PA05/PA06/PA07) outlined in 5.3.4 "Recommended Parameter Values by Actuator Model".

5.7 Saving/Loading Parameters

5.7.1 Saving Parameters

- ① From the "Parameter Setting" window in the setup software, select "Save As".
- $\ensuremath{\textcircled{}}$ Please specify location to be saved.
- ③ Please enter any file name.
- ④ Click "Save".

Files Saved

Γ	.prm2	Settings files for parameters PA, PB, PC, and PD

* Note Always upload current parameters from the driver to the software before saving. (See "LECSB Operation Manual (Simplified Edition)", section 5.3.2 for uploading.)

(See LECSB Operation Manual (Simplined Edition), section 5.5.2 for uploading.)



5.7.2 To Load saved Parameters

- ① From the "Parameter Setting" window in the setup software, select "Open".
- ② Please specify location of the file.
- ③ Please select the file you wish to import parameters [.prm2].
- ④ Click "Open".

Parameters will be loaded.

	Parameter Setting							
	📃 Axis 1 💽 📢 Rea	ad [👸 Se	t To Default 🛛 🗛 Verify	Parameter Copy	Parameter Block			
U	Open Save As							
	Function display	mmor	🖸 ファイルを開く				\mathbf{N}	
	Basic	Contro	ファイルの場所(1):	👰 コンピューター		🔽 🥝 👂 🗁 🛄 -		
	Extension Extension 2	Contr Posit	<u></u>	ハード ディスク	ドライブ (1)	2	^	
		Contr	最近表示した場所	S3A7904	85.3 GB/141 GB			
	Torque control Speed setting (Spee	Rotati	デスクトップ	リムーバブル記憶	域があるデバイス (1) ―――		^	
	Basic Extension	Rotat CCW			ドライブ (D:)			
	Gain changing Digital I/O		51759					
	Eist display		בטלב -א-					
	Gain/filter Extension			(3)	
			ネットワーク	ファイル名(N):			開((0)	
				ファイルの種類(T):	User Parameter Files(*prm2;*pr	m) 🔽 📘	キャンセル	
	<							

5.8 Saving/Loading Project

5.8.1 Saving Project

- ① From the "Project" menu in the setup software, select "Save As".
- 2 Please specify location to be saved.
- ③ Please enter any project name.
- ④ Click "Save".

Project will be saved in the specified folder.

If you change the drive / path name, it will be saved in the "drive ¥path name ¥ project name" folder you have changed.

* Note Always upload current parameters from the driver to the software before saving. (See "LECSB Operation Manual (Simplified Edition)", section 5.3.2 for uploading.)

9			ooningara	cone men	1 1					
1	Proje	ect View	Parameter	Safety	F	Sa	ve As Project			M
: [3	New		Ctrl+N		s	ave destination path:			
	3	Open		Ctrl+O	Ø		C:¥Users¥k7-076¥Desktop¥			Browse
		Close								
	۳	Save		Chilling		N	/orkspace/Project list:			
	D	Save As					Workspace			
		Delete								
		Read Other	Format	•						
		Write Other	Format	•						
		System Set	ting							
		Print Previe	w							
e	5	Print		Ctrl+P		V	Vorkspace name:			
		Exit MR Con	nfigurator2	Alt+F4	(3	F	Project name:			
			-			т	ītle:			
									4 Save	Cancel
							Save as a Single File Format	Project	Switch the window by clicking this when you want to use single file f	button ormat project.

5.8.2 To Load saved Parameters

- (1) From the "Project" menu in the setup software, select "Open".
- ② Please select the "drive ¥ path name ¥ project name" that you want to read parameters are stored.
- ③ Click "Open".

Project will be loaded.

:	Proj	iect View Parameter	Safety	Open	Project		×
	D	New	Ctrl+N	Save	destination path:		
1	B	Open	C#I+O	C:¥L	Jsers¥k7-076¥Desktop¥tes	t	Browse
		Close					
_	P	Save	Ctrl+S		2		_
_		Save As		Works	space/Project list: 🗢		Display all folders
_		Delete		Proj	ect	Amplifier model	Title
		Read Other Format	• 2	a .			Return to workspace list.
		Write Other Format	•		est	MR-J3-A	test
		System Setting					
		Print Preview					
	B	Print	Ctrl+P				
		Exit MR Configurator2	Alt+F4	Work	space name;	test	
				Proje	ect name;	test	
				Title:		test	
						(3
						``	Open Cancel
					Open a Single File Format P	Switch the windo when you want t	w by clicking this button o use single file format project.

5.9 Acquisition of motion waveform with graph monitor

With the setup software (MR Configurator2[™]: LEC-MRC2E) monitor graph function, the motion waveform during electric actuator operation can be obtained as described below.

① Click "Monitor" - "Graph" of Setup software to display "Graph" window.



5.9.1 Under the setting Tab: Setting of the items to display the graph

Set the items to display analogue and digital waveform, trigger conditions and time for the horizontal axis of the graph. Click the [Setting] tab of the [Setting] window to set the items to display the waveform, trigger conditions and horizontal axis of the graph.

3 types analogue waveform (analogue 1 to 3) and 4 types of digital waveform (digital 1 to 4) can be set.

Se	Setting 🥑					
Se	Setting Display Cursor					
s	eparate Axis s	Setting Initialization				
F	Times					
	ms/div	50 ms				
IL	Number of co	10 Div				
f	Trigger					
	Axis	Axis1				
	Data	Not selected				
Ľ	Mode	Single				
	Axis					
	Target axis	Axis1;				
	Parameter					
	Auto reading	ON				
17	Waveform					
	Analog 1	Motor speed				
	Analog 2	Torque				
L	Analog 3	Droop pulses (by 1 pls.				
L	Digital 1	INP				
	Digital 2	Not selected				
	Digital 3	Not selected				
	Digital 4	Not selected				

(1) Time

Set the horizontal axis (time axis) of the graph. For LECSB, set [ms/div] and [Number of collection Div] to the horizontal axis (time axis).

[ms/div] × [Number of collection Div] will be [Measurement time].

	Times	
ſ	ms/div	50 ms
l	Number of co	10 Div

① Click " 💽 " of [ms/div] and set the DiV number.

- The unit ms of [Number of collection Div] is 1000ms=1s.
- 2 Click " v of [Number of collection Div] and set the time.

	Times	
ᠿ	ms/div	50
2	Number of co	5
	Trigger	10
	Axis	20
	Data	50
	Mode	100
	Axis	200
	Target axis	500
	Parameter	1000
	Auto reading	2000
	Waveform	5000



(2) Trigger

"Trigger" is a condition which decides the display timing of the graph. If trigger conditions are not satisfied, waveform will not be displayed.

① Click " 💽 " of [Data] to set the condition. (In general, set the Motor speed.)



- (3) "Level" / "Condition" / "Position" are displayed.
 - 1 Click " 🔽 " of "Level" / "Condition" to set the condition.

	Ξ	Trigger				
		Axis	Axis1			
		Data	Motor speed			
	ſ	Level	100 r/min			
2	L	Condition	Rising			
	L	Position	10 %			
		Mode	Single			

For Motor speed, when the operation direction is positive, "Level" should be100 and when the operation direction is negative, "Level" should be -100.

Align the setting of "Condition" to the operation direction too.

"Level" / "Condition"	setting	(For Motor	speed)
-----------------------	---------	------------	--------

Operating direction	"Level" [r/min]	"Condition"
Positive direction operation	100	Startup
Negative direction operation	-100	Fall

"Position" should be 10%.

(4) Waveform

Set the waveform data which will be displayed in the graph.

① Click " 💽 " of each "Analog" or "Digital" and set the type of waveform to be displayed.



The analogue and digital waveforms that can be set with LECSB are shown below. ■Analogue waveform

No.	Name	Function	Unit	Note
1	Motor speed	The servo motor speed is displayed.	1r/min	
2	Torque	The servo motor torque is displayed.	0.1%	
3	Current command	The current command to be given to the servo motor is displayed.	0.1%	
4	Command pulse frequency	The command pulse frequency is displayed.	1.125 kpulse/s	
5	Command pulse frequency (by speed)	The command pulse frequency is converted into the servo motor speed and displayed.	1r/min	
6	Droop pulse (by 100 pulse)	The droop pulse on the deviation counter is displayed in units of 100pulse. The pulse count is displayed in encoder pulses.	100pulse	
7	Droop pulse (by 1 pulse)	The droop pulse on the deviation counter is displayed in units of 1 pulse. (Note) Any area beyond the display range (-32768 pulses to 32767 pulses) is clamped and displayed in red.	1pulse	
8	Speed command	The speed command to be given to the servo motor is displayed.	1r/min	
9	Bus voltage	The bus voltage of the driver amplifier is displayed.	1V	
10	Effective load ratio	The continuous effective load torque is displayed. The effective value for the last 15 seconds is displayed.	0.1%	
11	Regenerative load ratio	The ratio of regenerative power to permissible regenerative power is displayed in %.	0.1%	
12	Within one-revolution position	The position is displayed in encoder pulses` to the accuracy of one revolution.	16pulse	
13	ABS counter	The move distance from the home position in the absolute position detection system is displayed in the multiple-revolution counter value of the absolute position encoder.	1rev	
14	Load inertia moment ratio	The estimated ratio of the servo motor axis converted load inertia moment to the servo motor inertia moment is displayed.	0.1times	

No.	Name	Function	Unit	Note
15	Torque equivalent to disturbance	The difference between the torque required driving the servo motor and the actually required torque (torque current value) is displayed in torque equivalent to disturbance.	0.1%	
16	Overload alarm margin	The margin until the load reaches the overload (AL.50, AL.51) alarm level is displayed in %. An overload alarm will occur when margin is 0%.	0.1%	
17	Excessive error alarm margin	The margin until the error reaches the excessive error (AL.52) alarm level is displayed in encoder pulses. An excessive error alarm will occur when margin is zero pulses.	16pulse	
18	Settling time	The settling time for position control is displayed. The method for measuring the settling time can be selected from the separate axis setting.	1ms	
19	Overshoot amount	The overshoot amount for position control is displayed in encoder pulses. The method for measuring the overshoot amount can be selected from the separate axis setting.	1pulse	
20	Motor speed (by 0.1 r/min)	The servo motor speed is displayed.	0.1r/min	(Note 1)
21	Command pulse frequency (0.1r/min by speed)	The command pulse frequency is converted into the servo motor speed and displayed.	0.1r/min	(Note 1)
22	Speed command (by 0.1 r/min)	The speed command to be given to the servo motor is displayed.	0.1r/min	(Note 1)

■ Digital waveforms

SON, LSP, LSN, TL, TL1, PC, RES, CR, SP1, SP2, SP3, ST1, ST2, CM1, CM2, LOP, EMG, STAB2, RS1, RS2, CDP, D1, D2, D3, D4(Note2) RD, SA, ZSP, TLC, VLC, INP, WNG, ALM, OP, MBR, DB, ACD0, ACD1, ACD2, BWNG, CDPS, ABSV

(Note 1) They will be supported in the driver of software version C7 or later. (Note 2) D1, D2, D3 and D4 are for the manufacturer setting.

See "LECSB Operation Manual", section 3.5 for details of each digital waveform.

5.9.2 Trigger wait

When the "Start" button is clicked, the screen will be on stand-by.

When trigger conditions are satisfied during the trigger wait, waveforms can be captured and displayed.

Click the "Start" button every time measurement fresh capture is required.

(The advantage of this method of capturing the waveform is a waveform will not be updated in the case of an incorrect operation.)

Graph X 4 Þ 🗕 🔁 Open 🕌 Import 💾 Save As 🛛 Image 🖓 History Management 🖓 Parameter Display | Select History 🔤 🕞 Previous 🔘 Next | 💆 Overwrite 🔭 Torque Charact. 🛄 FFT 🔝 Scatterplot | 📲 Reread 🛛 📇 Screen Copy 😰 Scale Optimization | 🗔 Gray Display 🙀 Cursor | 🕀 Zoom 🏎 Move Ø V-scale operation: Axis1 1 NP 🚍 Setting Display Cursor tor s min] Separate Axis Setting Initialization Times Setting meth Div automation • **A** Measuremen 500 ms ~ 10,000-1,000 10,000 Trigger Axis Axis1 900 9,000 9,000 Data Motor speed Level 100 r/min 8,000 800 8,000 Condition Startup Position 10 % 7,000 700 7,000 Mode Single Axis Target axis Axis 1; 6,000 600 6,000 Parameter Auto reading ON 500 5,000 5,000 Waveform Analog 1 Motor speed 4,000 400 4,000 Analog 2 Torque Analog 3 Droop pulses (by 1 pls 3,000 300 3,000 Digital 1 INP Digital 2 Not selected 2,000 200 2,000 Digital 3 Not selected Digital 4 Not selected 1,000 100 1,000 0 Measurement time • 50 100 150 200 250 300 350 400 450 500 0.89 ms < >

1 Click the "Start" button.

② Trigger wait is displayed.

③ The acquisition of waveform will be canceled with "Stop" button.



5.9.3 Operation Instruction

When the PLC on the master side sends the operation command, the actuator will operate. When the trigger conditions in 5.9.1 (2) are satisfied, the operation waveforms can be captured.

When the time set in 5.9.1 (1) has passed after the acquisition start, the acquisition of the waveforms will complete and waveforms are displayed on the screen.

① When the "Scale Optimization" button is clicked, the vertical axis range is adjusted automatically.



5.9.4 Saving of waveform

After the waveform is displayed, it is possible to save the data in 3 ways.

- Click the "Save As" button.
 Select the folder in which the step data is to be saved and save the data.
 Waveform data file (extension: gpf2) will be prepared.
 If the waveform condition needs to be checked, it can be displayed on the graph window.
- ② Click the "Save Image" button. Select the folder in which the step data is to be saved and save the data. An Image file (extension: jpg) will be prepared.
- Click the "Screen Copy" button. Save the displayed waveform screen (print screen).



5.10 Display All Monitor List

The method how to obtain the electric actuator condition is described with the display all function of the setup software.

- ① Click "Monitor" "Display All" of the setup software to display "Display All" window.
- ② The condition of each item is displayed.
 - For off line of the setup software, [----] will be displayed.





The following items are displayed for LECSB.

No.	Name	Function	Display range	Unit
1	Cumulative feedback pulses	Feedback pulses from the servo motor encoder are counted and displayed. When exceeding 999999999, it returns to zero. Press the [Clear] button to reset the display value to 0 (zero). Reverse rotation is indicated by a minus (-) sign.	-9999999999 to 9999999999	pulse
2	Servo motor speed	The servo motor speed is displayed. The value rounded off is displayed in 0.1r/min.	-7200 to 7200	r/min
3	Droop pulses	The number of droop pulses in the deviation counter is displayed. Reverse rotation is indicated by a minus (-) sign. The number of pulses displayed is in the encoder pulse unit.	-9999999999 to 9999999999	pulse

No.	Name	Function	Display range	Unit
4	Cumulative command pulses	The position command input pulses are counted and displayed. Press the [Clear] button to reset the display value to zero.	-9999999999 ~ 9999999999	pulse
5	Command pulse frequency	The frequency of the position command input pulses is displayed. Reverse rotation is indicated by a minus (-) sign. (Note) The value will be -1500 to 1500 kpulse/s when inputting command pulse. It will be displayed in encoder pulse unit at the test modes.	-999999999 ~ 9999999999	kpulse/ s
6	Analog speed command voltage Analog speed limit voltage	Speed control mode The input voltage of analog speed command (VC) is displayed. Torque control mode The input voltage of analog speed limit (VLA) is displayed.	-10.00 ~ +10.00	V
7	Analog torque command voltage	Position control mode/Speed control mode The voltage of analog torque limit (TLA) is displayed.	0 ~ +10.00	V
	Analog torque limit voltage	Torque control mode The voltage of analog torque command (TC) is displayed.	-8.00 ~ +8.00	V
8	Regenerative load ratio	The ratio of regenerative power to permissible regenerative power is displayed in %. As the permissible regenerative power depends on whether there is the regenerative brake option or not. Set Parameter PA02 correctly according to the regenerative brake option. The guideline is 80% or less.	0~100	%
9	Effective load ratio	The continuous effective load current is displayed. The effective value is displayed relative to the rated current of 100%.	0~300	%
10	Peak load ratio	The maximum torque is displayed. The highest value in the past 15 seconds is displayed relative to the rated torque of 100%.	0~400	%
11	Instantaneous torque	Torque that occurred instantaneously is displayed. The value of the torque that occurred is displayed in real time relative to the rated torque of 100%.	0~400	%
12	Within one-revolution position	Position within one-revolution is displayed in encoder pulses. The value returns to 0 when it exceeds the maximum number of pulses.	0~262143	pulse
13	ABS counter	The move distance from the home position (0) in the absolute position detection system is displayed in terms of the absolute position detector's multi-revolution counter value.	-32768 ~ 32767	rev
14	Load inertia moment ratio	The estimated ratio of the servo motor axis converted inertia moment to the servo motor inertia moment is displayed.	0.0~300.0	times
15	Bus voltage	The voltage (across (P) - (N) and (P+) - (N-)) of the main circuit converter is displayed.	0~900	V

6. Home position return method

6.1 Position control (pulse input) mode

When using home position return by the position control (pulse input) mode, use the home position function of the positioning unit of the upper level PLC.

For wiring and setting the parameters of the positioning unit; equipment handling information and details of how to return to origin please check the manual of the equipment used.

7. Operating method of each mode

7.1 Position control mode

Position control with pulse train input

7.1.1 Operation instruction

Command pulse is an input to the driver from the positioning unit. The driver operates the actuator in accordance with the command pulse. The command pulse and driver operation examples are shown below.



7.2 Speed control mode

This mode allows for accurate, smooth control of the rotation speed and direction of the servo motor. Analog speed can be commanded with LECSB.

* To set [PC**], set parameter write inhibit [PA19] to "000C".

7.2.1 Operation instruction

When the signals ST1 and ST2 turn on, the servo motor rotates. An operation example of the speed control mode is shown below.

Speed setting

Speed command and speed

The servo motor is run at the speeds set in the parameters or at the speed set by the applied voltage of the analog speed command (VC).

The relationship between the analog speed command (VC) applied voltage and the servo motor speed is shown below.

Rated speed is achieved at \pm 10V with initial setting. The speed at \pm 10V can be changed using parameter No.PC12.



The following table indicates the rotation direction according to forward rotation start (ST1) and reverse rotation start (ST2) combination.

(Note 1) Input device			(Note 2) Rotation direction				
070	ST1	Analog speed command (VC)			Internal speed		
512		+ Polarity	0V	-Polarity	commands		
0	0	Stop	Stop	Stop	Stop		
0		(Servo lock)	(Servo lock)	(Servo lock)	(Servo lock)		
0	1	CCW	Stop	CW	CCW		
1	0	CW	(No servo lock)	CCW	CW		
4		Stop	Stop	Stop	Stop		
	1	(Servo lock)	(Servo lock)	(Servo lock)	(Servo lock)		

Note 1. 0: off

1: on

2. If the torque limit is canceled during servo lock, the servo motor may suddenly rotate according to position deviation with respect to the command position.

In general make the connections shown below.



Refer to "LECSB Operation Manual", section 5.4 for assignment of signal.

(Note) Input device		evice		
SP3	SP2	SP1	Speed command value	
0	0	0	Analog speed command (VC)	
0	0	1	Internal speed command 1 (parameter No.PC05)	Initial
0	0 1 0		Internal speed command 2 (parameter No.PC06)	pnase
0	1	1	Internal speed command 3 (parameter No.PC07)	
1	0	0	Internal speed command 4 (parameter No.PC08)	
1	0	1	Internal speed command 5 (parameter No.PC09)	
1	1	0	Internal speed command 6 (parameter No.PC10)	
1	1	1	Internal speed command 7 (parameter No.PC11)	
Note. 0:	off			-

LECSB speed comr	nand parameter setting
------------------	------------------------

1: on

For LECSB, analog speed command and speed from 7 patters can be set.

Signals assigned at the initial setting are SP1 and SP2.

Assign signals of speed selection 3 (SP3) when the driver is used to [Internal speed command 7].

Refer to "LECSB Operation Manual", Chapter 3 for details on analog speed command.

7.3 Torque control mode

Servo motor output torque is controlled. Speed control function is also available. Analog torque can be commanded with LECSB. * To set [PC**], set parameter write inhibit [PA19] to "000C".

7.3.1 Operation instruction

When the signals RS1 and RS2 turn on, the servo motor rotates. An operation example of the torque control mode is shown below.

(1) Torque control

(a) Torque command and torque

A relationship between the applied voltage of the analog torque command (TC) and the torque produced by the servo motor is shown below.

The maximum torque is generated at $\pm 8V$. Note that the torque at $\pm 8V$ input can be changed with parameter No.PC13.



The following table indicates the torque generation directions determined by the forward rotation selection (RS1) and reverse rotation selection (RS2) when the analog torque command (TC) is used.

	(Note) Inp	out device	Rotation direction Torque control command (TC)				
	DOO	D 04					
	R52	R51	+Polarity	0V	-Polarity		
	0	0	Torque is not generated.		Torque is not generated.		
_	0	1	CCW (reverse rotation in driving mode/forward rotation in regenerative mode)	Torque is not generated.	CW (forward rotation in driving mode/reverse rotation in regenerative mode)		
	1	0	CW (forward rotation in driving mode/reverse rotation in regenerative mode)		CCW (reverse rotation in driving mode/forward rotation in regenerative mode)		
	1	1	Torque is not generated.		Torque is not generated.		
0: of	f						



In general make the connections shown below.



Refer to "LECSB Operation Manual", section 5.4 for assignment of signals.



8. Troubleshooting

8.1 Alarms and warning list

POINT

As soon as an alarm occurs, turn off Servo-on (SON) and power off.

When a fault occurs during operation, the corresponding alarm or warning is displayed. If any alarm or warning has occurred, refer to "LECSB Operation Manual", section 9.2 or 9.3 and take the appropriate action. When an alarm occurs, ALM turns off.

Set "DDD1" in parameter No.PD24 to output the alarm code, it is outputted by ON/OFF of bit0 to bit2. Warnings (AL.92 to AL.EA) have no alarm codes. Any alarm code is output at the occurrence of the corresponding alarm. In the normal status, the alarm code is not output.

After its cause has been removed, the alarm can be deactivated by any of the methods marked **O** in the alarm deactivation column.

Λ		(Note 2) Alarm code		2)		Alarm deactivation			\geq	Display	Name
$\left \right\rangle$				de		Alarm deactivation			AL 02	Battery cable	
					Name		Press		1	AL.92	disconnection warning
$ \rangle$	Display CN	CN1	1 CN1	CN1		Dowor	"SET" on	Alarm		AL 06	Home position setting
		22	23	24		Power	current	reset	1	AL.90	error
		(bit2)	(bit1)	(bit0)			alarm	(RES)		AL.99	Stroke limit warning
							screen.			AL.9F	Battery warning
	AL.10	0	1	0	Undervoltage	0	0	0			Excessive regeneration
	AL.12	0	0	0	Memory error 1 (RAM)	0	/	/		AL.EU	warning
	AL.13	0	0	0	Clock error	0	/	/		AL.E1	Overload warning 1
	AL.15	0	0	0	Memory error 2 (EEP-ROM)	0	/	/	g		Absolute position counter
	AL 16	4		0	Encoder error 1	0			Ľ	AL.ES	warning
	AL. 10	I	1	0	(At power on)	0			Na	AL.E5	ABS time-out warning
	AL.17	0	0	0	Board error	0		/	-		Servo emergency stop
1	AL 10	0	0	0	Memory error 3	0			1	AL.E0	warning
	AL. 19	0	0	0	(Flash-ROM)	0		\sim			Cooling fan speed
	AL.1A	1	1	0	Motor combination error	0	/	/		AL.EO	reduction warning
	AL 20	1	1	0	Encoder error 2	0	/			AL.E9	Main circuit off warning
	AL.20	I	1	0	(during runtime)	0		\sim		AL.EA	ABS servo on warning
	AL 21	1	1	0	Encoder error 3	\cap	/			AL.EC	Overload warning 2
	AL.ZI	I		0	(during runtime)	0		\sim			Output watt excess
	AL.24	1	0	0	Main circuit error	0	0	0		AL.LD	warning
	AL.25	1	1	0	Absolute position erase	0	/	/			
	AL.30	0	0	1	Regenerative error	(Note 1)	(Note 1)	(Note 1)			
ms	AL 21	1	0	1	Overspeed	0	0	0			
lar		1	0	0	Overcurrent	0	\sim	\sim			
∢		0	0	1	Overvoltage	0	\sim				
1	7.L.00	0	0	-	Command pulse frequency						
	AL.35	1	0	1	alarm	0	0	0			
1	AL.37	0	0	0	Parameter error	0	/				
		0		Main aircuit davias averbast	(Note 1)	(Note 1)	(Note 1)				
	AL.45	AL.45 0 1		iviain circuit device overheat	0	0	0				
	AL 46	0	1	1	Servo motor overheat	(Note 1)	(Note 1)	(Note 1)			
	76.40	0				0	0	0			
1	AL.47	0	1	1	Cooling fan alarm	0	/]		
	AL.50	0	1	1	Overload 1	(Note 1)	(Note 1)	(Note 1)			
	AL.51	0	1	1	Overload 2						
	AL.52	1	0	1	Error excessive	ŏ	Õ	Õ			
					Serial communication						
1	AL.8A	0	0	0	time-out	0	0	0			
1	AL.8E	0	0	0	Serial communication error	0	0	0			
	88888	$^{\prime}$	/	/	Watchdog	0					

Note 1. Deactivate the alarm about 30 minutes of cooling time after removing the cause of occurrence. 2. 0: off

1: on



8.2 Alarm Display

The contents of the alarm / warning that is currently occurring in the driver are displayed in the alarm display function of the setup software.

In addition, history is listed for alarms that occurred in the past.

- ① Click "Diagnosis" "Alarm Display" of the setup software to display "Alarm Display" window.
- 2 Alarms / warnings currently occurring in the driver display the contents.
 - If no alarm / warning has occurred, it will not be displayed.
- ③ Lists the history (Maximum 6 cases) of alarms that occurred in the past. (Warnings are not displayed.)

Diagnosis Te	st Mode Adjustr	ient T				
Alarm Disp	lay	1				
Alarm Ons	et Data					
MELSOFT MR Configurato	r2 New project					- 0 ×
: Project View Parameter	Safety Positioning-data Monitor	Diagnosis Test Mode Adjustment Tools	Window Help			
D 🖻 🖻 / / / Ø	S 🖉 🖷 📬 🌆 📆 🧟					
Project # ×	Alarm Display ×					4 0 -
New project	Alarm Display					
Unit Conversion	Axis1					
Axis1:MR-J3-A	o. Name	Est	t. occurrence time Est. elapsed tin	e (h) Detailed information		
Parameter	AL. 16 Encoder error 1 (At	power on) 2	017/04/04 15:31:58 0	44	\mathbf{N}	
	Encoder connector (CN2) disconn	ected.				
	Encoder fault.					
	Encoder cable is faulty.					
Servo Assistant 4 ×	(Wire breakage or shorted.)					
Assistant List	Encoder cable type (2-wire, 4-wir	e) selection was wrong in parameter setting.				
	External noise caused the commu	nication error.				
Servo Startup Procedure	<checking method=""> • Check that the encoder cable a</checking>	nd the power cables are wired side by side.				
Servo Servo	 Check that the servo amplifier is Check the grounding of the service 	not influenced by noise of magnetic valves, mag o amplifier and the servo motor.	gnetic contactors or relays.			
Step1 Amp Motor	 Check that there is no cause of Check that the shield of the end 	static electricity around.				
step2	Additional informations/Alarm room	t displa)				
Step 1: Amplifier Setting	Additional information. (Ald in res	(usoue)				
Amplifier Setting			atta	Commend Marrie Docust		
Step 2: Test Run	Alarm history		old Display Causes Again	Occurred Alarmi Keser		
Step 3: Serve Adjustments	Number	Name	Time (h)	Detailed information		
Servo Adjustments	1 AL.20	Encoder error 2 (During runtime) Encoder error 1 (At power on)	26	44	3	
	2 AL.20	Encoder error 2 (During runtime)	26	47		
Servo Amplifier Parts	3 AL. 16	Encoder error 1 (At power on)	26	44		
Maintenance	4 AL.52	Error excessive	26	04		
If a Problem Occurs	3 AL.32	error excessive	20	04		
Troubleshooting			Alarm/Warning List	Glear		
	50. 					
Ready		[5	Station 00] MR-J3-A Servo amplifier conn	ection: USB		OVR CAP NUM SCRL

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