SMC

Operation Manual
（Simplified edition）

PRODUCT NAME

AC Servo Motor Driver
(Pulse input type)

MODEL / Series / Product Number

LECSB Series

SMC Corporation

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文書管理 No.　－　旧文書体系 No.　対応表

文書管理 No.	旧文書体系 No.
JXC※-OMT0054	LEC-OM05805
JXC※-OMT0054-A	LEC-OM05806

本書は、対応文書の原紙と一緒に保管する。

CONTENTS

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.

⚠	**Caution**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠	**Warning**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠	**Danger**	**Danger** 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.

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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 ⚠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).

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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 positioning/stopping with high-speed pulse train.

1. Configuration

Minimum equipment and wiring requirements to get started

Ex) 200 V AC (*1)

Provided by customer

Provided by customer

PC

Electric Actuators
Ex) LEF

PLC (Positioning unit)

Power supply
for I/O signal
24 VDC
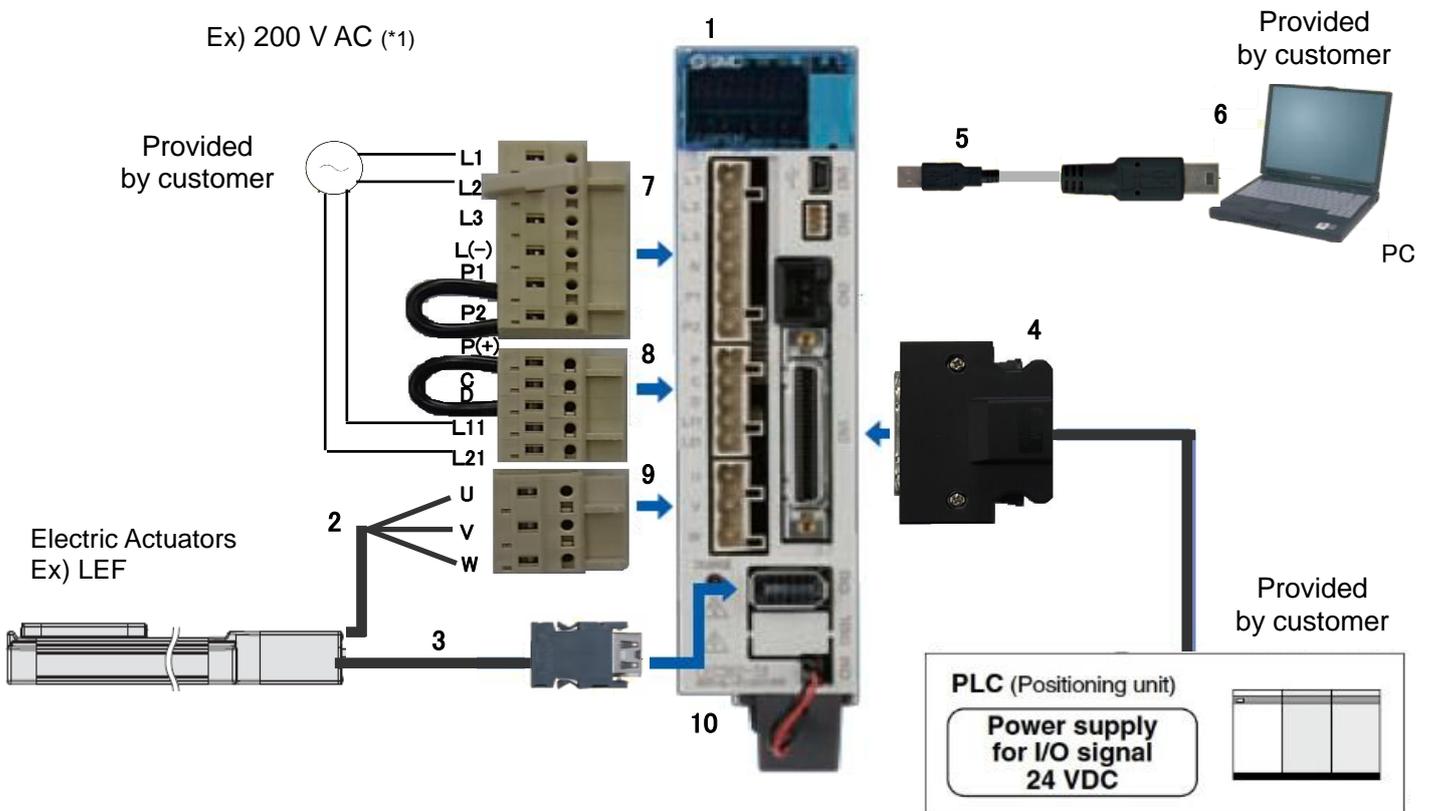
(*1) Refer to "LECSB Operation Manual", Chapter 3 if the power supply voltage is 100VAC.

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 (MR Configurator2™)	LEC-MRC2*
7	Main circuit power supply connector	CNP1 (Accessory)
8	Control circuit power supply connector	CNP2 (Accessory)
9	Motor connector	CNP3 (Accessory)
10	Battery	LEC-MR-J3BAT（a bundled item） 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

Wiring
See [3. Wiring]

Parameter setting
See [4. Parameter list for each mode]

Parameter Settings using the Setup Software (MR Configurator2^{TM})
See [5. Parameter Settings using the Setup Software (MR Configurator2^{TM})]

Signal assignment setting
See [5.5 Changing I/O Signal Allocation]

Home position return Method
See [6. Home position return method.]

Setting of **[Position control mode]**
See [7.1. Position control mode]

Setting of **[Speed control mode]**
See [7.2. Speed control mode]

Setting of **[Torque control mode]**
See [7.3. Torque control mode]

- Position control with pulse train input

- Speed control by specifying the internal set speed with I/O signal

- Thrust control by specifying the internal set torque with I/O signal.

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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
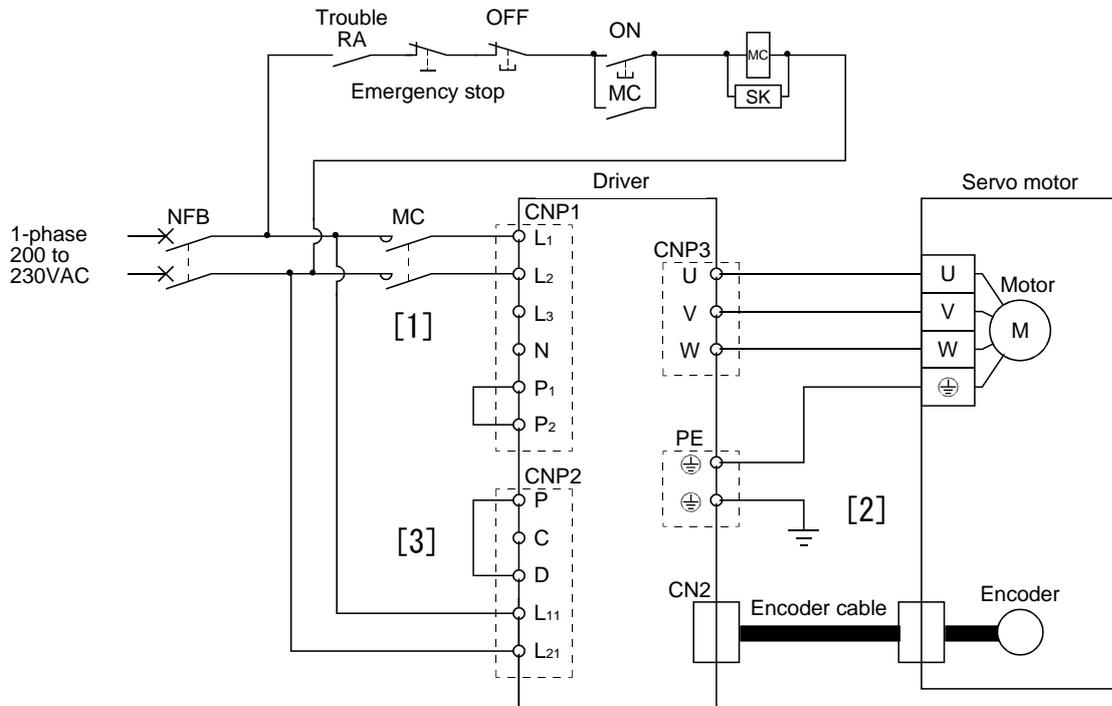
[1] Provide specified power supply to input terminals L_1 and L_2.

[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.

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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.
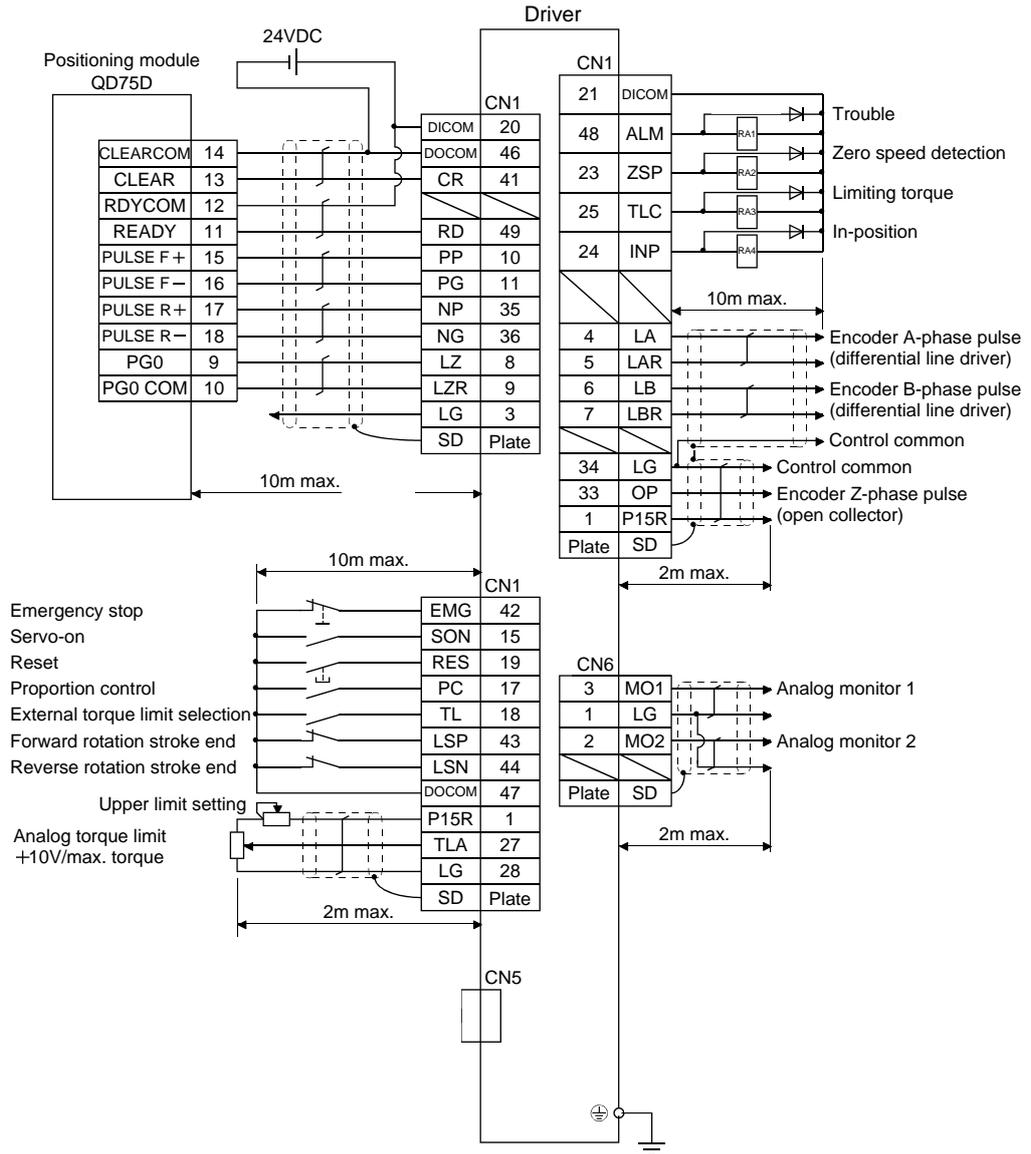
Refer to "LECSB Operation Manual", section 3.2 for wiring details.
Refer to "LECSB Operation Manual (Simplified Edition)", section 3.2.1 (2) and (3) for input/output signal details.

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(2) Input signal

Position control mode: P, Speed control mode: S, Torque control mode: T

●: Automatic ON can be set, ○: Initial setting, □: Assignment is available with parameter,

ー: Assignment is not available

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

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(3) Output signal

Position control mode: P, Speed control mode: S, Torque control mode: T

○: Initial setting, □: Assignment is available with parameter, ─: Assignment is not available

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

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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.

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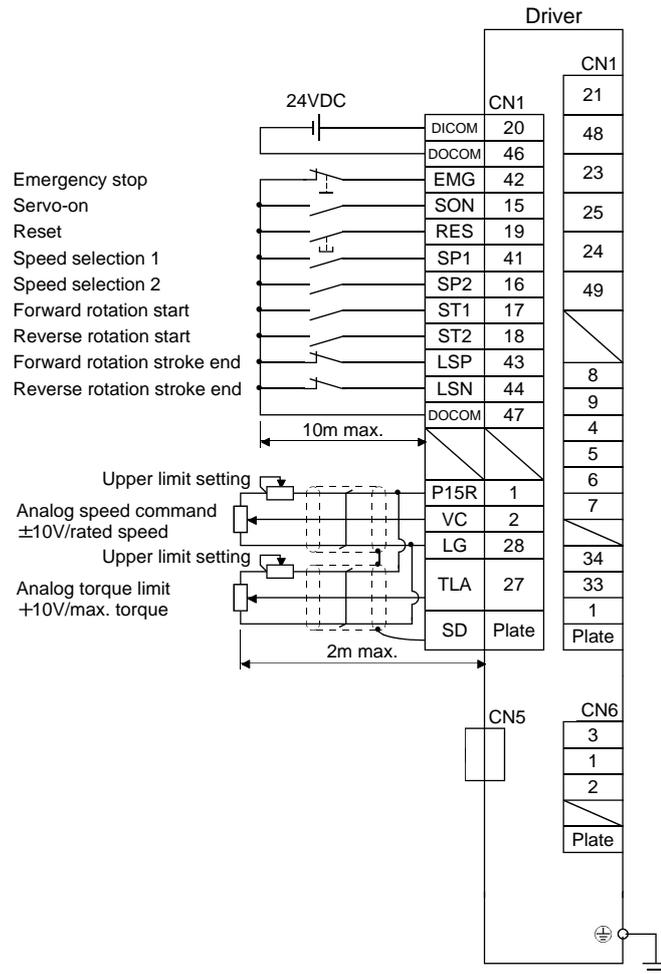
3.2.3 Torque control mode (Sink I/O interfaces)

(1) Signal connection example of LECSB

A connection example of the torque control mode is shown below. Connect wires if necessary.
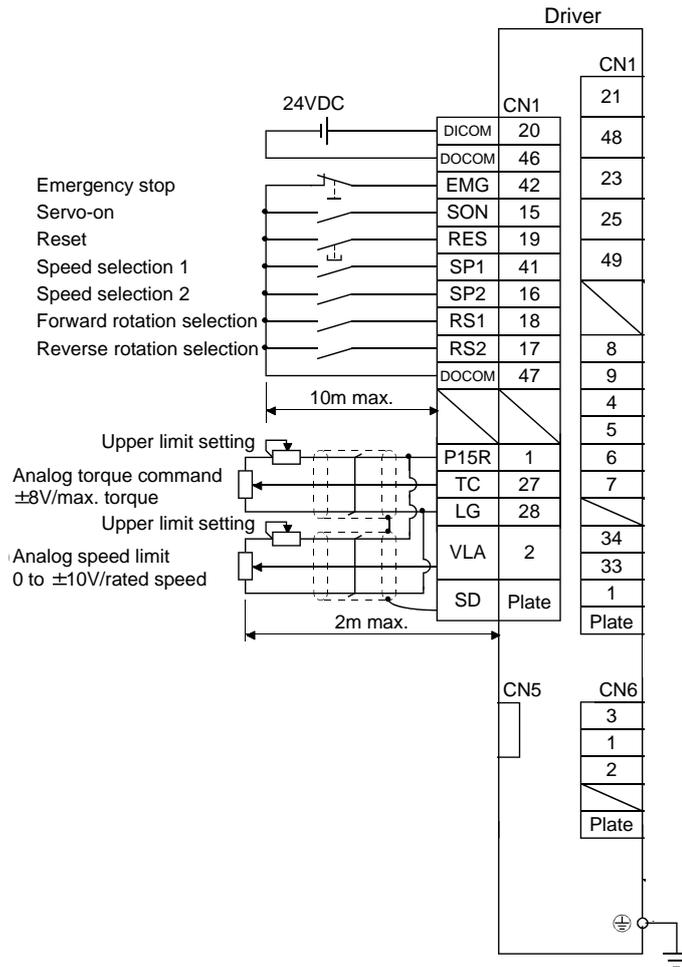
Refer to "LECSB Operation Manual", section 3.2 for wiring details.
Refer to "LECSB Operation Manual (Simplified Edition)", section 3.2.1 (2) and (3) for input/output signal details.

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
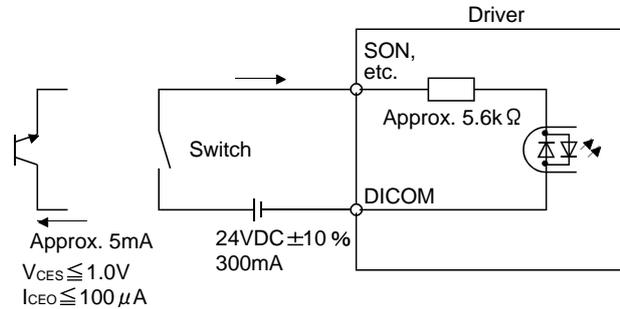
(2) Digital output interface DO-1

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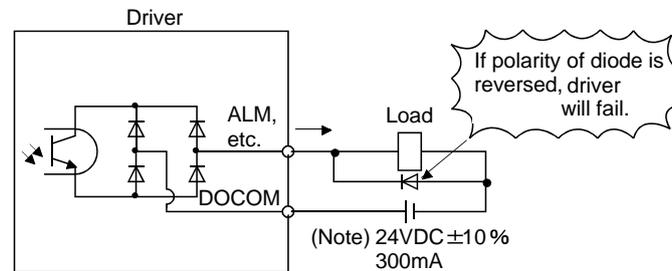
Note. If the voltage drop (maximum of 2.6V) interferes with the relay operation, apply high voltage (up to 26.4V) from external source.

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.

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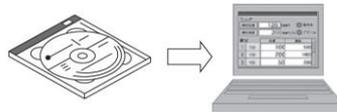
*1 Setup software version 1.19V or above is required.
*2 The setup software (MR Configurator2™ : LEC-MRC2E) must be purchased as an additional item.
*3 The USB cable (LEC-MR-J3USB) must be purchased as an additional item.

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.**

AL. E6

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 Configurator2TM)

① Connect the PC and LECSB using the USB cable.

② Turn on the power of the LECSB.

③ Start application "MR Configurator2".

Once the application starts, the screen below will be displayed.
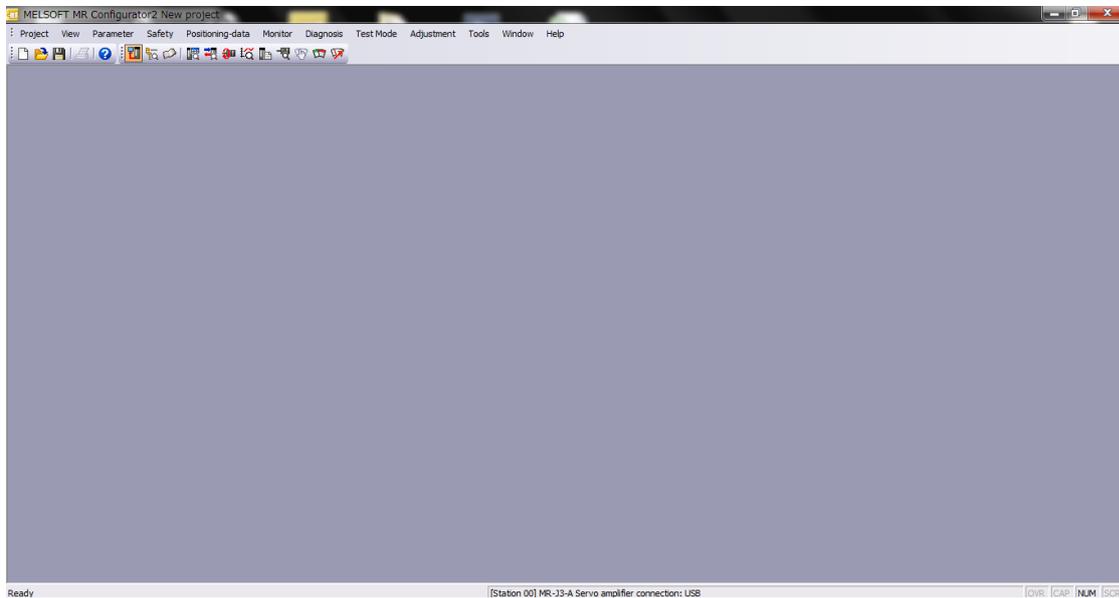
5.2.2 "System Settings"

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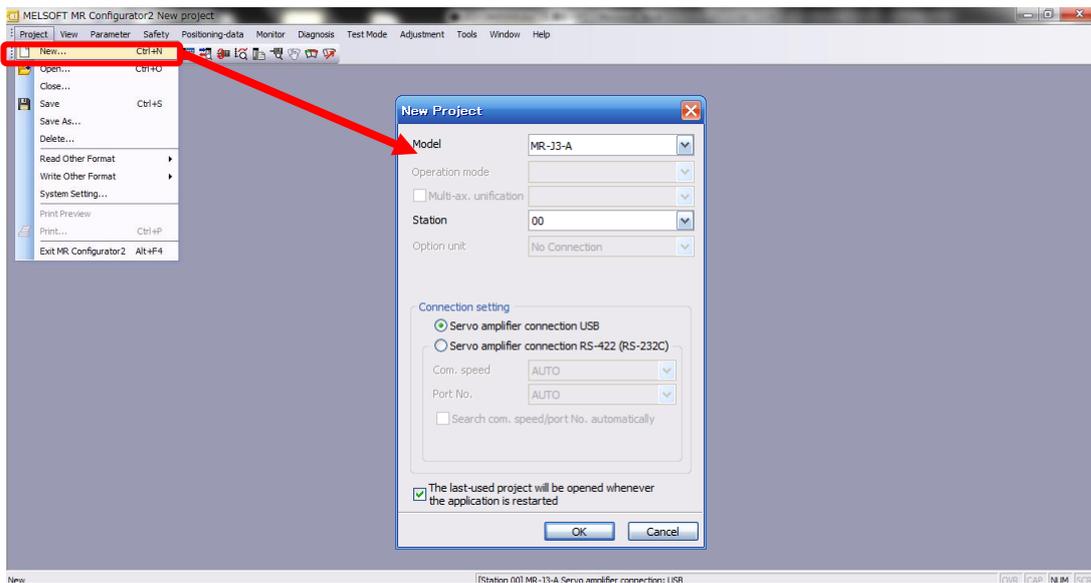
5.2.3 Model Selection

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.
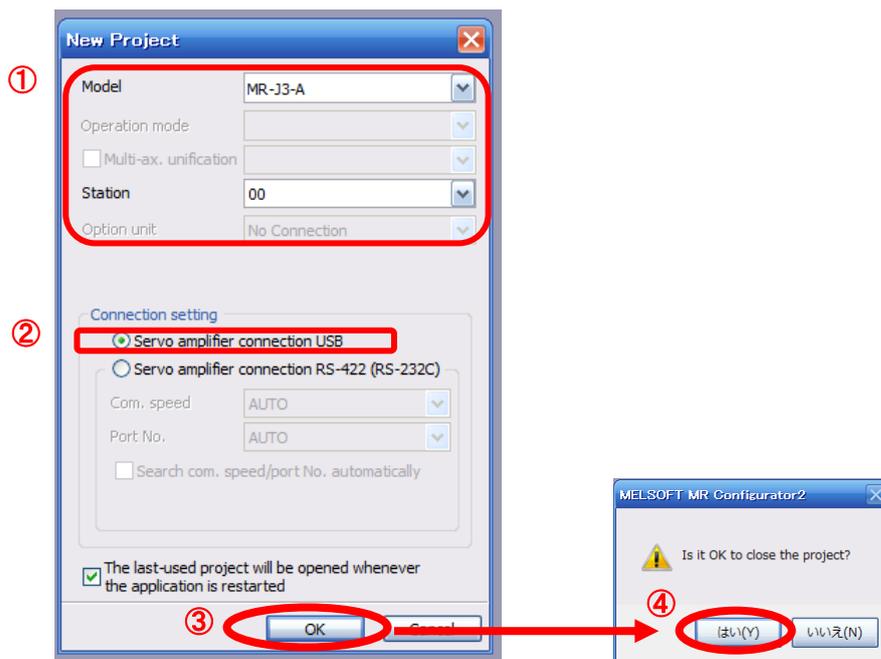
5.2.4 Driver ON LINE Check

Check that the driver is enabled (ONLINE).

Check that the "ONLINE/OFFLINE" icon is displayed " ".

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.
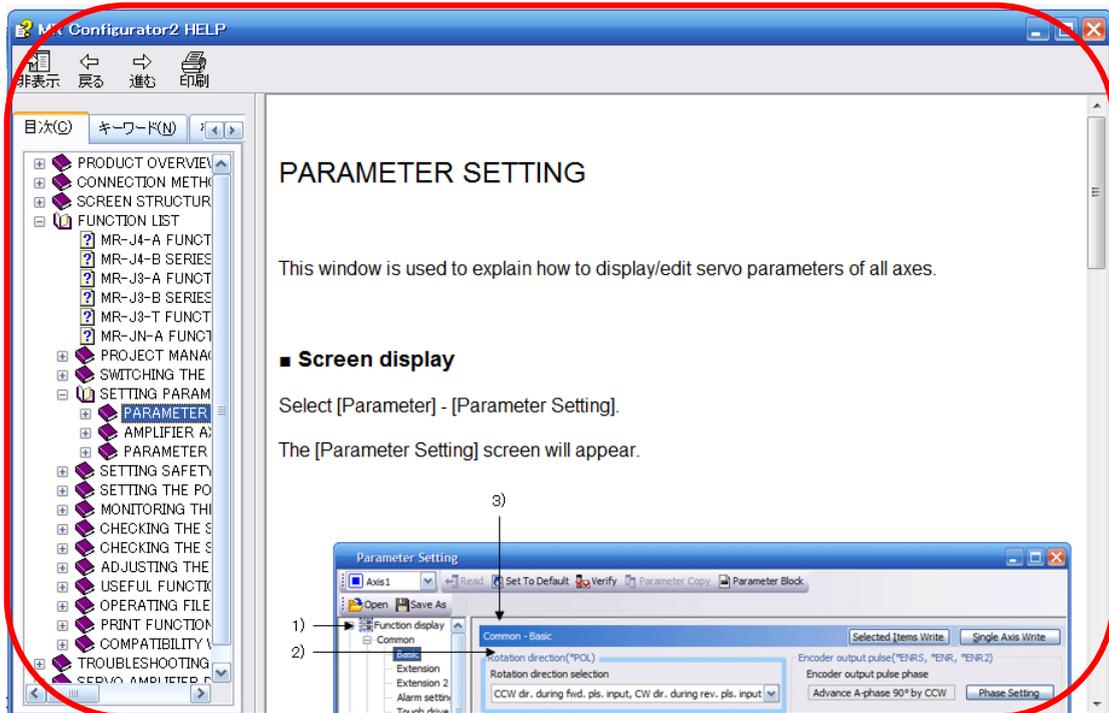
5.3 Parameter setting (Driver side)

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.

② 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".)
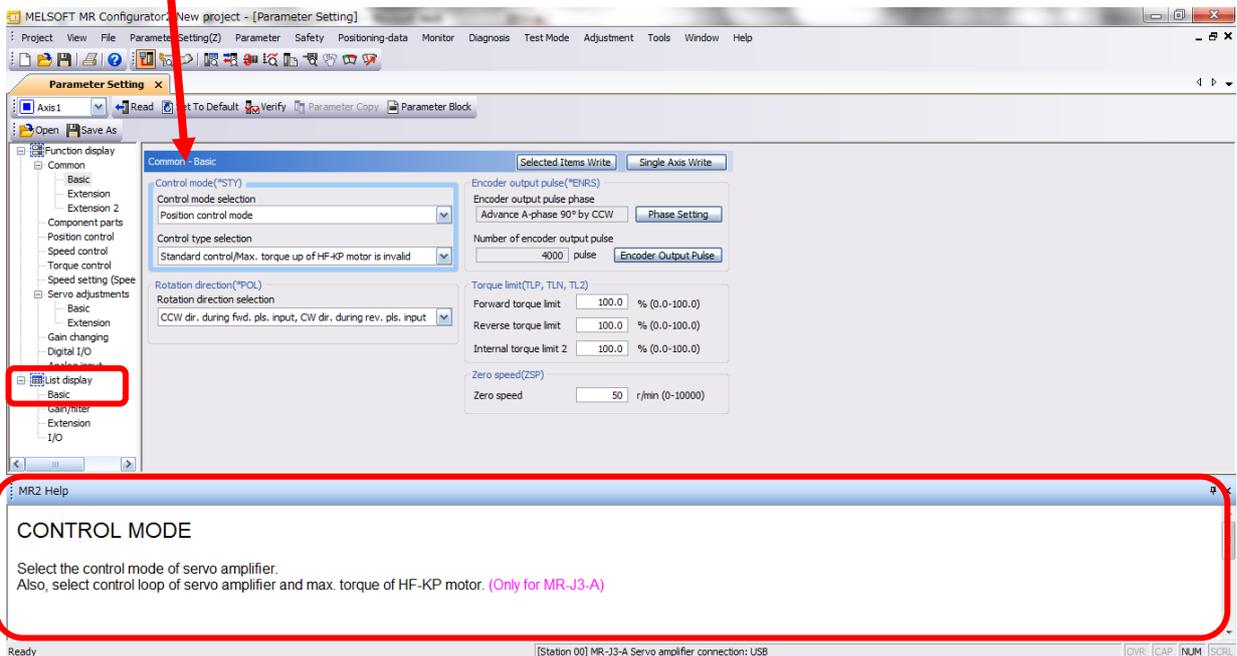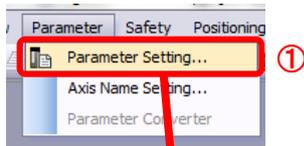
③ When each item of "List display" is clicked, "Parameter list" screen along each item is displayed.
When "Basic" is selected, it is displayed as follows.

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.

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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.**

④ Please click "Read".

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.

① 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".
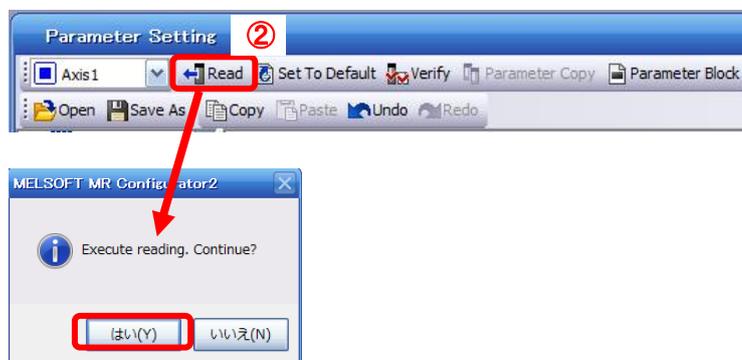
5.3.3 Parameter setting method

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 OFFand ON again. The Parameter is then enabled.

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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 [LEF]

Series	Para. No.	Initial value	LEFS25			LEFS32			LEFS40		
Lead symbol			H	A	B	H	A	B	H	A	B
Lead			20	12	6	24	16	8	30	20	10
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	32768								
Electronic gear denominator *3	PA07	1	250	150	75	300	200	100	375	250	125
Regenerative option	PA02	0000	0000(Non) / 0002(LEC-MR-RB-032)								
Rotation direction selection *4	PA14	0	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.

*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 ⇒ Set the recommended parameter value ⇒ Operation start)
*3 The travel distance of the actuator per 1 pulse should be 10 [μm/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).

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Series			LEFB25	LEFB25U	LEFB32	LEFB32U	LEFB40	LEFB40U
	Lead symbol		S					
	Lead		54					
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	32768					
Electronic gear denominator *3	PA07	1	675					
Regenerative option	PA02	0000	0000(Non) / 0002(LEC-MR-RB-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	0002		0000			
★ Load to motor inertia moment ratio	PB06	7	50					
★ Machine resonance suppression filter 1	PB13	4500	400		4500			
★ Notch shape selection 1	PB14	0000	0030		0000			

★ Parameter should be changed.
☐ 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 ⇒ Set the recommended parameter value ⇒ Operation start)
*3 The travel distance of the actuator per 1 pulse should be 10 [μm/pulse].

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Recommended Parameter Values [LEJ]

Series			LEJS40			LEJS63			LEJB40	LEJB63
	Lead symbol		H	A	B	H	A	B	T	
	Lead		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	32768						65536	32768
Electronic gear denominator *3	PA07	1	300	200	100	375	250	125	675	525
Regenerative option	PA02	0000	0000(Non) / 0002(LEC-MR-RB-032) / 0003(LEC-MR-RB-12)							
Rotation direction selection	PA14	0	1 (+：Counter motors side)						0 (+：Counter motors side)	
★Adaptive tuning mode	PB01	0000	0000						0002	0000
★Load to motor inertia moment ratio	PB06	7	7						50	
★Machine resonance suppression filter 1	PB13	4500	4500						400	4500
★Notch shape selection 1	PB14	0000	0000						0030	0000

★ Parameter should be changed.
☐ 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 ⇒ Set the recommended parameter value ⇒ Operation start)
*3 The travel distance of the actuator per 1 pulse should be 10 [μm/pulse].

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Recommended Parameter Values [LEY]

Series		Initial value	LEY25/ LEYG25			LEY25D/ LEYG25D			LEY32/ LEYG32			LEY32D/ LEYG32D		
	Lead symbol		A	B	C	A	B	C	A	B	C	A	B	C
	Lead		12	6	3	12	6	3	20	10	5	16	8	4
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	32768		65536	32768		65536	32768		65536	32768		
Electronic gear denominator *3	PA07	1	150	75	75	150	75	75	250	125	125	200	100	50
Regenerative option	PA02	0000	0000 (Non)/ 0002 (LEC-MR-RB-032)											
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	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											

Series		Initial value	LEY63				LEY63D		
	Lead		A	B	C	L	A	B	C
	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	Recommended 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	125	125	125	250	125	125
Regenerative option	PA02	0000	0000 (Non)/ 0002 (LEC-MR-RB-032)/ 0003 (LEC-MR-RB-12)						
Rotation direction selection *4	PA14	0	0 (+：Counter motors side)				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.

*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 ⇒ Set the recommended parameter value ⇒ 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).

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

```
   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.

Parameter No.PA03

0	0	0	

Selection of absolute position detection system (Refer to chapter 14)
0: Used in incremental system
1: Used in absolute position detection system
   ABS transfer by DI0
2: Used in absolute position detection system
   ABS transfer by communication

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.

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

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

$\cdot$ [PA05] = 0(Initial value)
  Initial value 0 correspond to "Number of command input pulses per revolution." 262144 [pulses/rev].

$$\frac{\cdot [PA06]}{\cdot [PA07]} = \frac{[\text{Number of command input pulses per revolution}] \times P \times \frac{1}{1000}}{[\text{Actuator lead L [mm]}] \times n1/n2}$$

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)

$$\frac{[PA06]}{[PA07]} = \frac{262144 \times 10 \times \frac{1}{1000}}{6 \times 1/1}$$

$$\frac{[PA06]}{[PA07]} = \frac{262144 \times 10}{6 \times 1000}$$

$$\frac{[PA06]}{[PA07]} = \frac{32768}{75}$$

*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

① 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→ON, the parameter is enabled.)
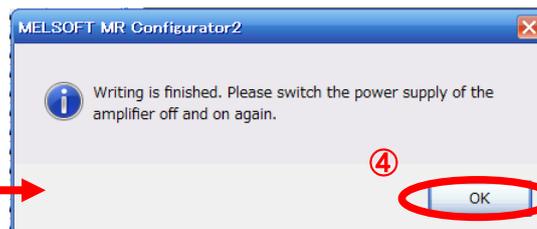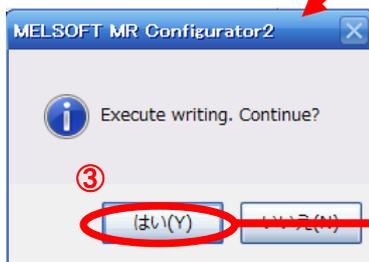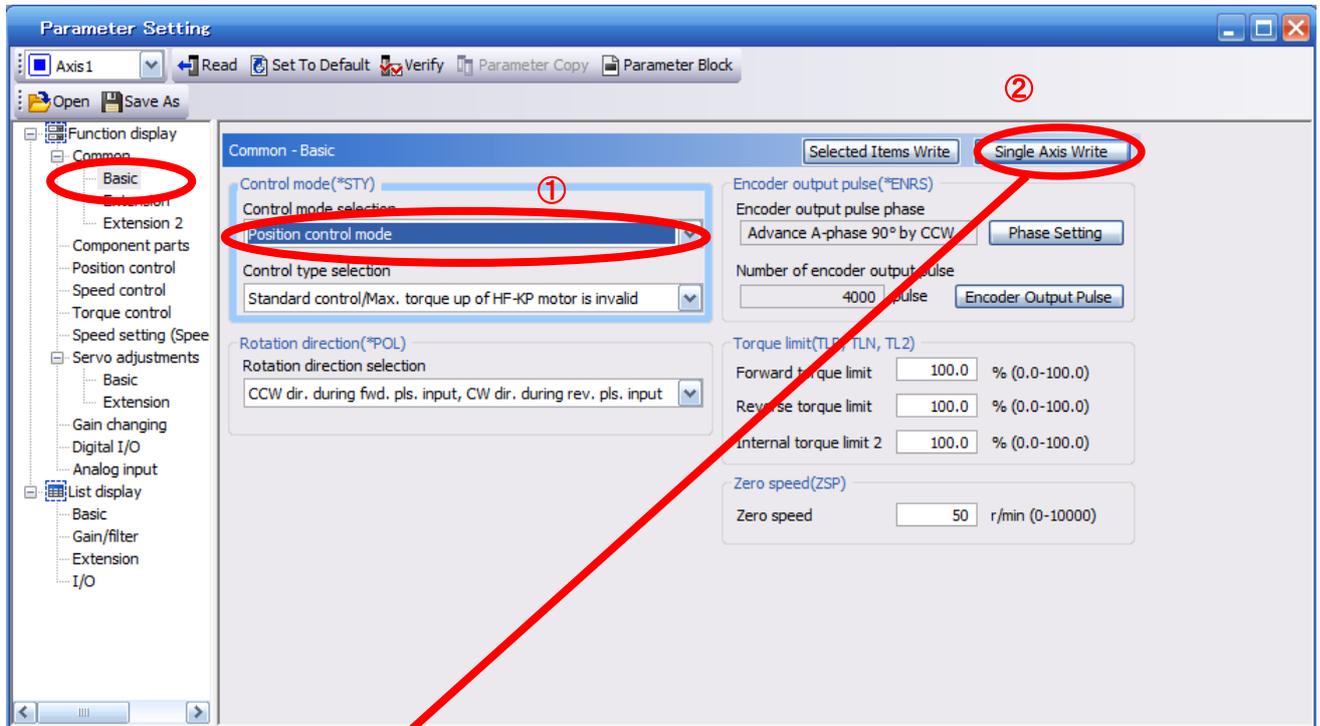
5.3.8 Set the parameter of command pulse input form

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 value	Unit	Setting range	Control mode		
No.	Symbol	Name				Position	Speed	Torque
PA13	PLSS	Command pulse input form	0000h		Refer to the text.	○		

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 ⌐‾ or _⌐ 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	Negative logic	Forward rotation pulse train Reverse rotation pulse train	PP NP	
0011h		Signed pulse train	PP NP	
0012h		A-phase pulse train B-phase pulse train	PP NP	
0000h	Positive logic	Forward rotation pulse train Reverse rotation pulse train	PP NP	
0001h		Signed pulse train	PP NP	
0002h		A-phase pulse train B-phase pulse train	PP NP	
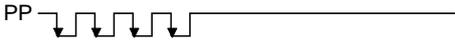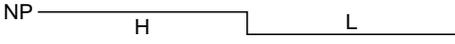
EX.) To set the command pulse input configuration to pulse train + Symbol in a positive logic.
   [PA13] = 0001

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.

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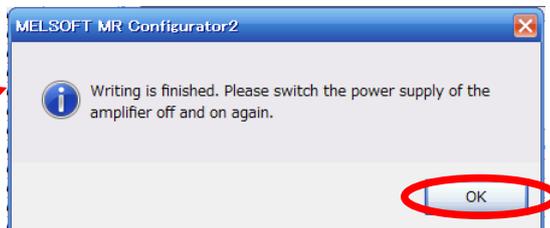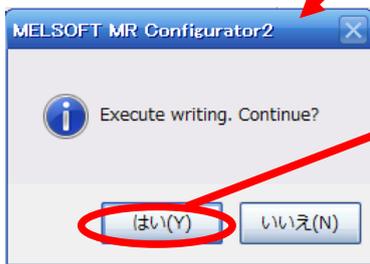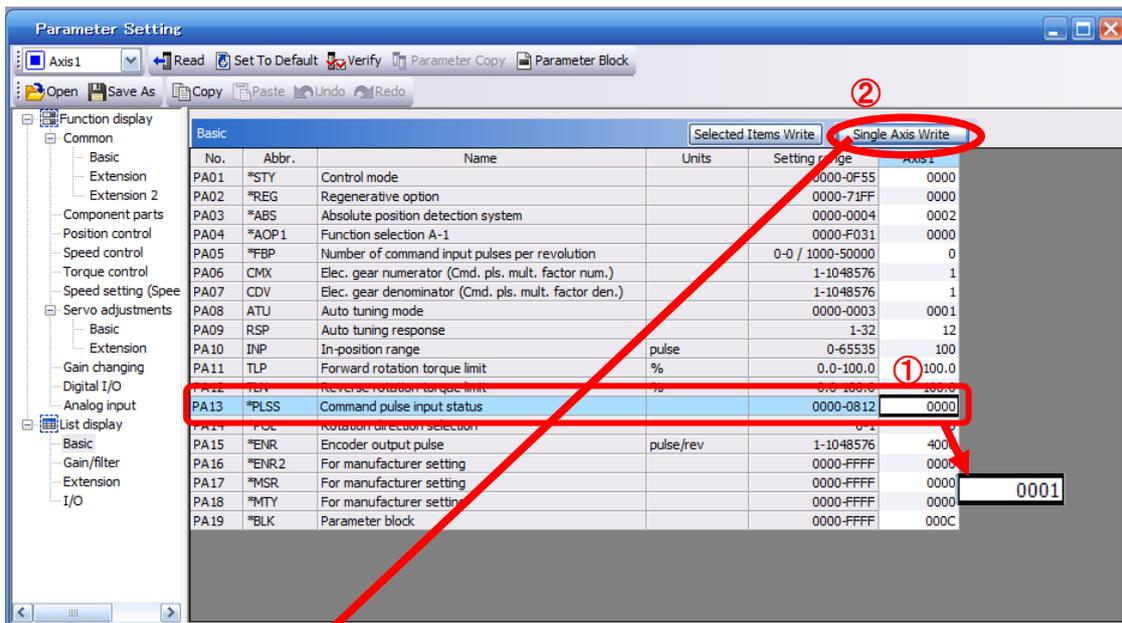
5.3.9 Verify of parameters

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.

② 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.

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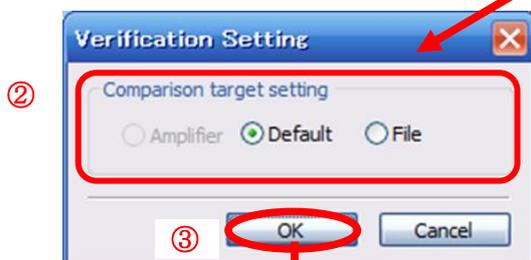
5.3.10 Parameter initialization

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.
② 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.
④ 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.
⑥ **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.)
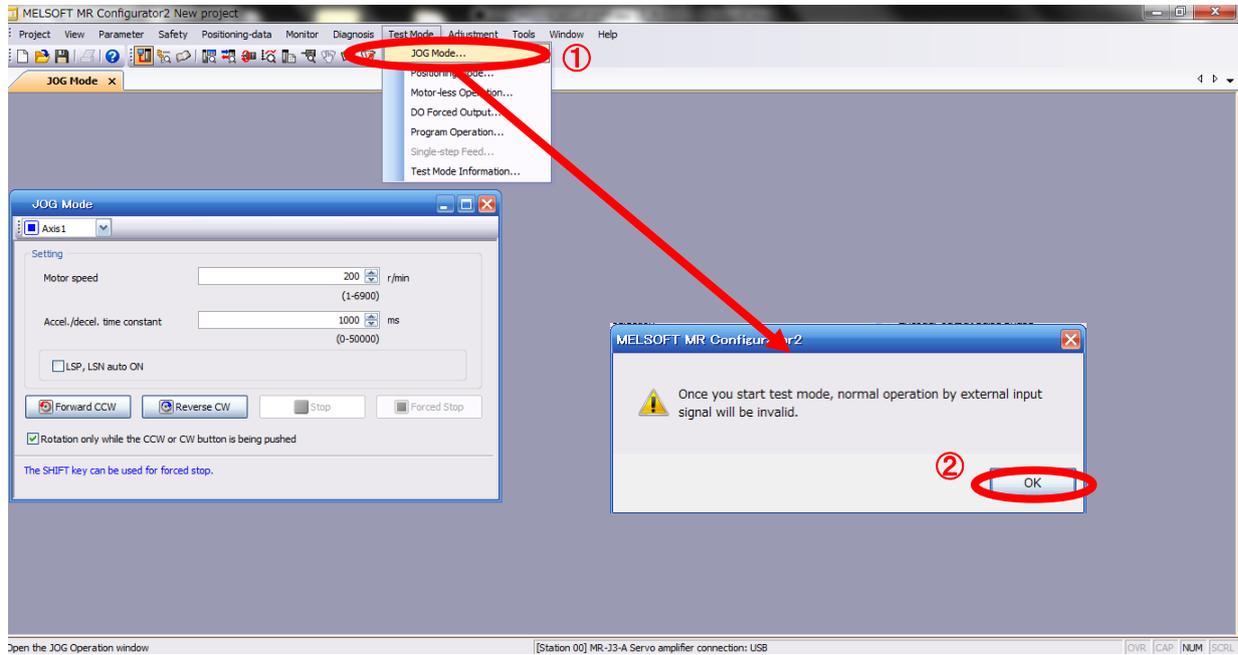
5.4.1 JOG Mode

① 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.

② 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).
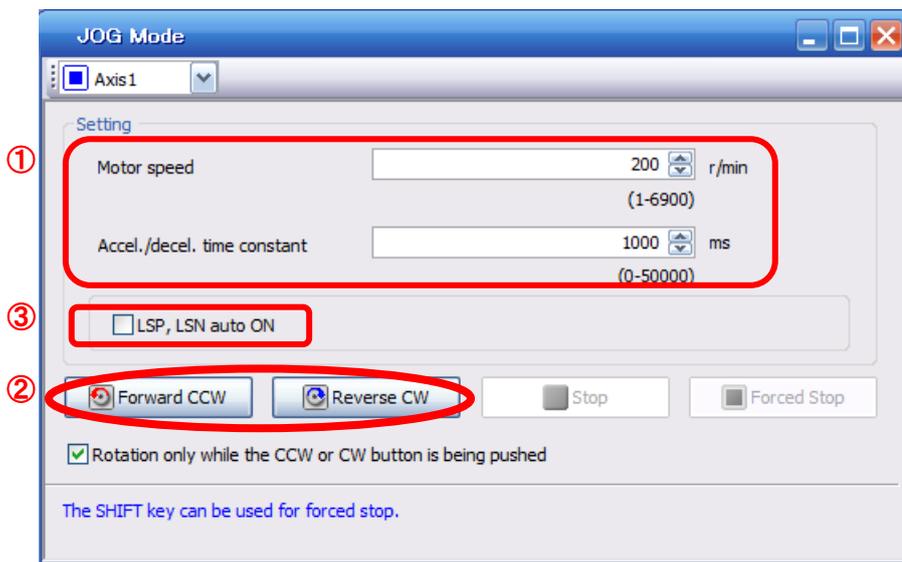
Item	Setting range	Unit	Description
Motorspeed	0 ~ allowable actuator speed	r/min	Set the command speed of the servo motor for execution of positioning (**motor rotations/minute**).
Acceleration/deceleration time	0 ~ 50000	ms	Set the time until the servo motor reaches/stops to the rated speed (3000 r/min).

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 signals will turn ON automatically when the control circuit power supply is turned on., doing this allows additional I/O signal selection range.
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 will automatically turn on when power supply turns on.

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

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No.	Symbol	Name and function	Initial value
PD01	*DIA1	Input signal automatic ON selection 1 Select the input devices to be automatically turned ON.	0000h

Signal name	Initial value BIN	Initial value HEX
	0	
	0	0
Servo-on (SON)	0	
	0	

If you want to the SON to automatic ON

Binary number (BIN) "0100" to Hexadecimal (HEX) "4"

Signal name	Initial value BIN	Initial value HEX
Proportion control (PC)	0	
External torque limit selection (TL)	0	0
	0	
	0	

Binary number (BIN) "0000" to Hexadecimal (HEX) "0"

Signal name	Initial value BIN	Initial value HEX
	0	
	0	
Forward rotation stroke end (LSP)	0	0
Reverse rotation stroke end (LSN)	0	

If you want to the LSP and LSN to automatic ON

Binary number (BIN) "1100" to Hexadecimal (HEX) "C"

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

Binary number -> Decimal / Hexadecimal

Binary number				Decimal	Hexadecimal
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	B
1	1	0	0	12	C
1	1	0	1	13	D
1	1	1	0	14	E
1	1	1	1	15	F

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* 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.

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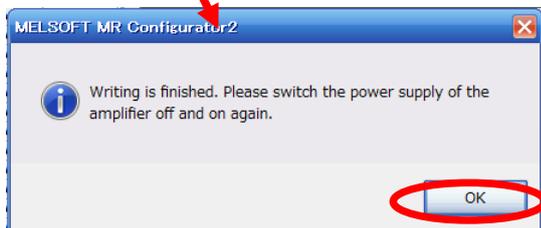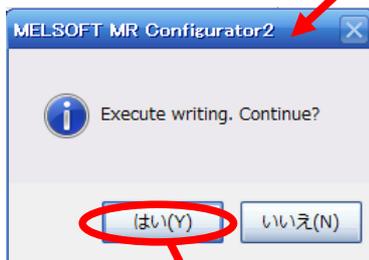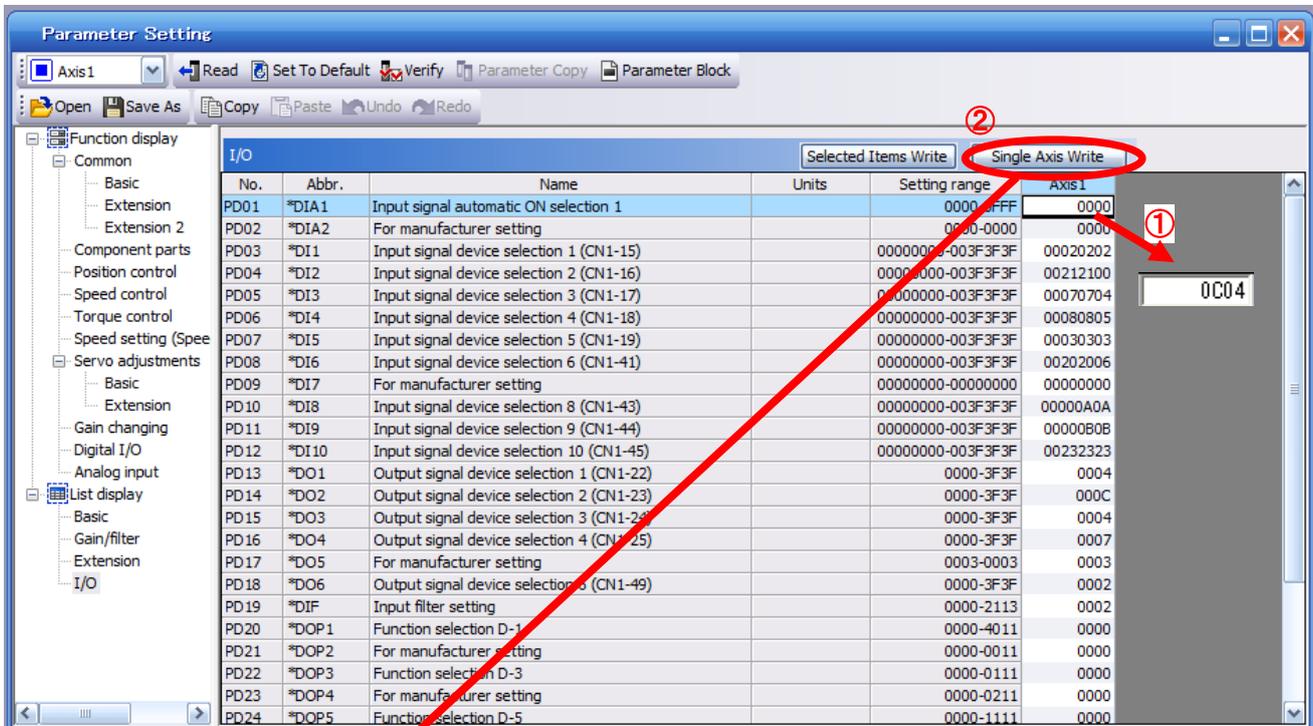
5.5.2 Initial I/O Signal Allocation

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)**

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

Device	Symbol	Connector pin No	I/O division	Parameters No	Initial 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 limit selection	TL	CN1-18	DI-1	PD06	00080805
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

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

Device	Symbol	Connector pin No	I/O division	Parameters No	Initial 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.

② Click the I/O tab.

③ When changing the allocation of signals, parameters for "PD03" - "PD08", "PD10" - "PD16" or "PD18" can be altered.

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	DI-1	PD03	00020202
- (Unallocation)	-	CN1-16	DI-1	PD04	00212100
Proportion control	PC	CN1-17	DI-1	PD05	00070704
External torque limit selection	TL	CN1-18	DI-1	PD06	00080805
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

Device	Symbol	Connector pin No	I/O division	Parameters No	Initial value
Servo-on	SON	CN1-15	DI-1	PD03	00020202
Gain changing selection	CDP	CN1-16	DI-1	PD04	00212100→ 0021210D
Proportion control	PC	CN1-17	DI-1	PD05	00070704
External torque limit selection	TL	CN1-18	DI-1	PD06	00080805
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

① Changing PD04 from 00212100 to 002121**0D**

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. 0 0 _ _ _ 0 D Position control mode Speed control mode Torque control mode Select the input device of the CN1-16 pin.

Setting	Control modes (Note 1)		
	P	S	T
00			
01	For manufacturer setting (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 manufacturer setting (Note 2)		
0D	CDP	CDP	
0E to 1F	For manufacturer 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 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.

SMC

(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.**

   * 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.

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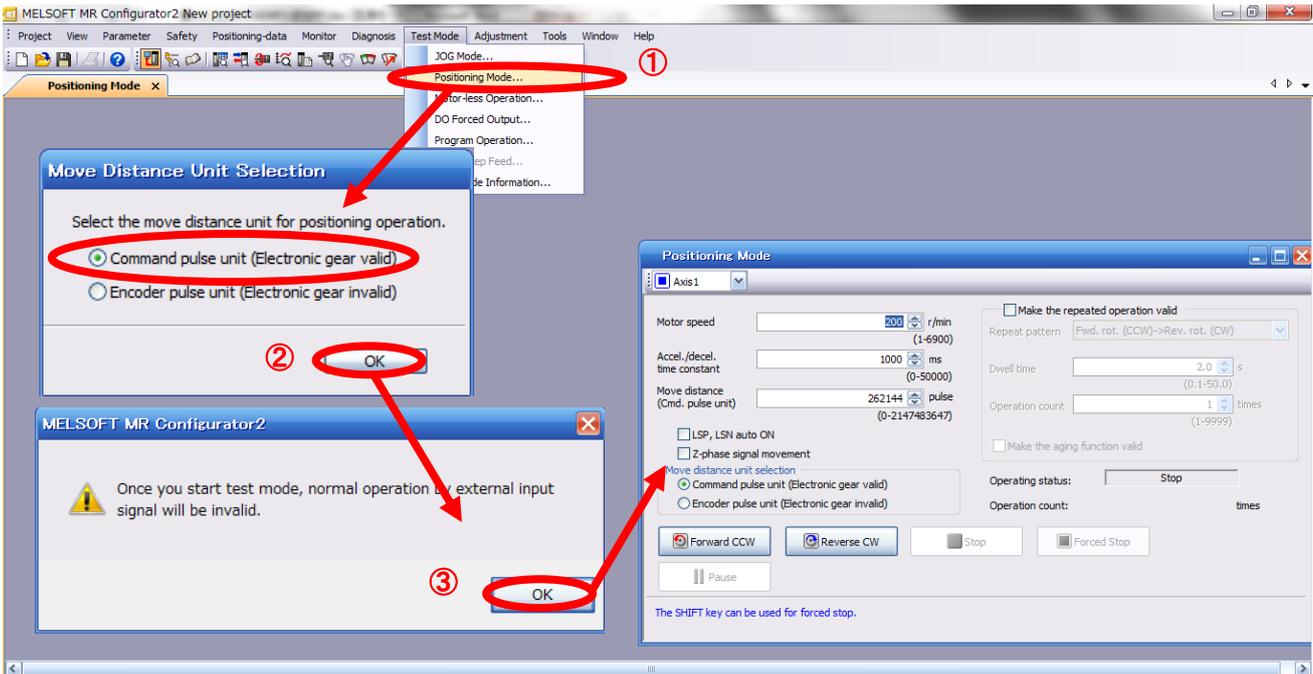
5.6.1 Positioning Mode

① 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.
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.

② 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[μm] (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.)
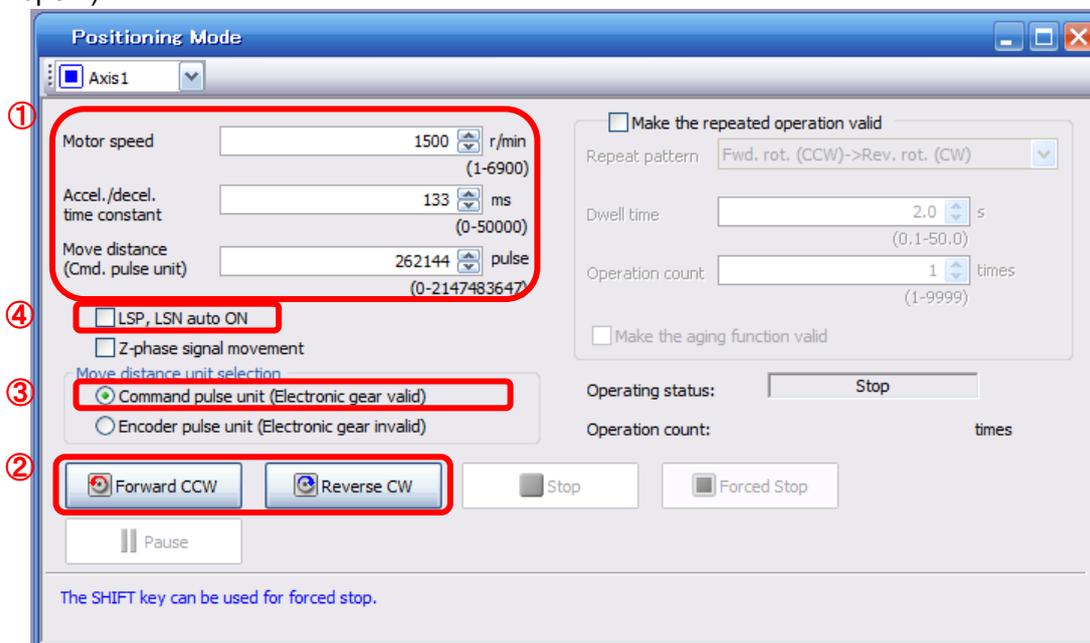
Item	Setting range	Unit	Description
Motorspeed	0 ~ Allowed Speed for each actuator	r/min	Set the command speed of the servo motor for execution of positioning (**Motor rotations/min**).
Acceleration/deceleration time	0 ~ 50000	ms	Set the time until the servo motor reaches/slows to the rated speed **(3000 r/min)**
Move distance	0 ~ 2147483647	pulse	Sets movement distance.

5.6.2 Motor speed Configuration

<Rotation Speed Configuration>

   ① 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 example using an actuator with a 20mm lead and 500[mm/sec] speed.

Rotations per Second

Distance of movement per second ÷ Distance of movement per rotation

Rotation Speed (rpm) = Speed (mm/s) ÷ Lead (mm) }×60 (S)
                  = {500 (mm/s) ÷20 (mm) }×60 (s) =1500 (rpm)
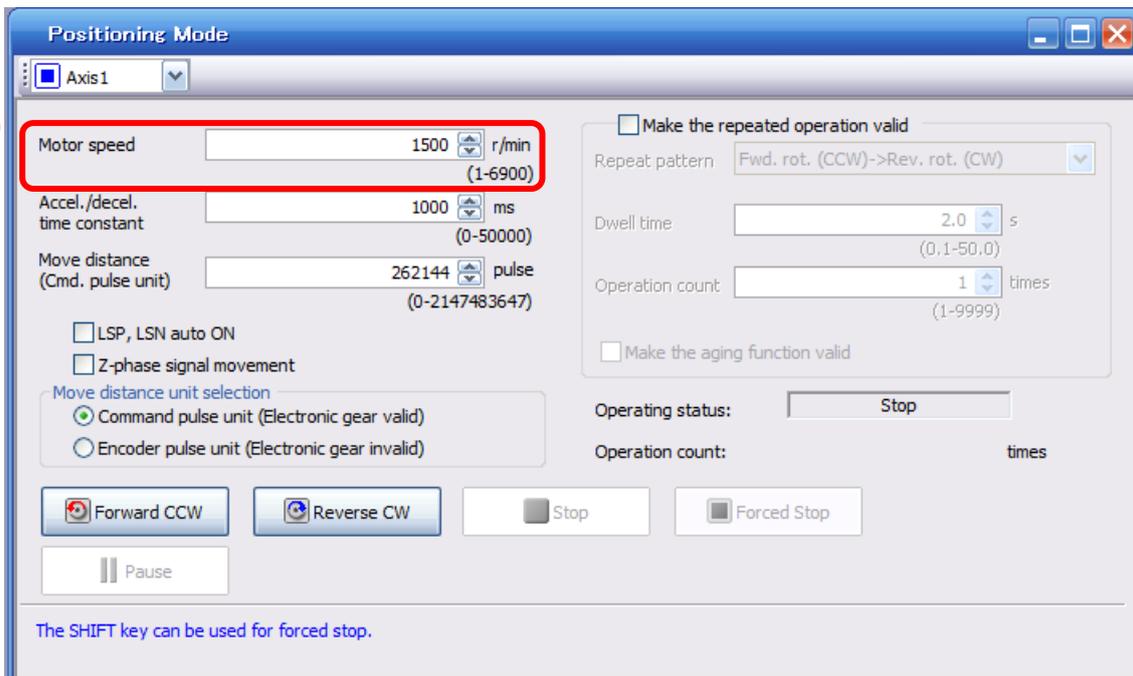
5.6.3 Acceleration/deceleration Time Configuation

< Acceleration/deceleration Time Configuration>

① 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

$$\text{Accel/decel time (ms)} = \frac{\{\text{Rated Rotation Speed (r/min)} \div 60\ (S)\} \times \text{Screw Lead (mm)}}{\text{Acceleration/deceleration speed (mm/s}^2)} \times 1000 \ *$$

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

$$\text{Acceleration/deceleration time (ms)} = \frac{\{3000\ (r/min) \div 60\ (S)\} \times 8\ (mm) \times 1000}{3000\ (mm/s^2)}$$

$$= 133\ (ms)$$

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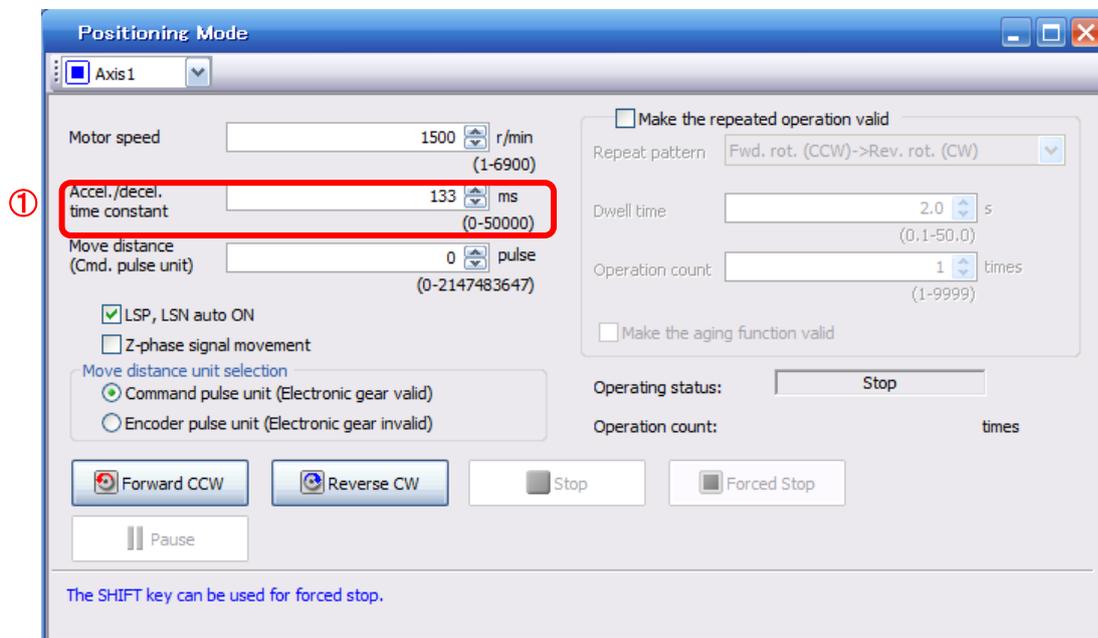
5.6.4 Move distance Configuration and Operation

< 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[μm] (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)

*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".

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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.

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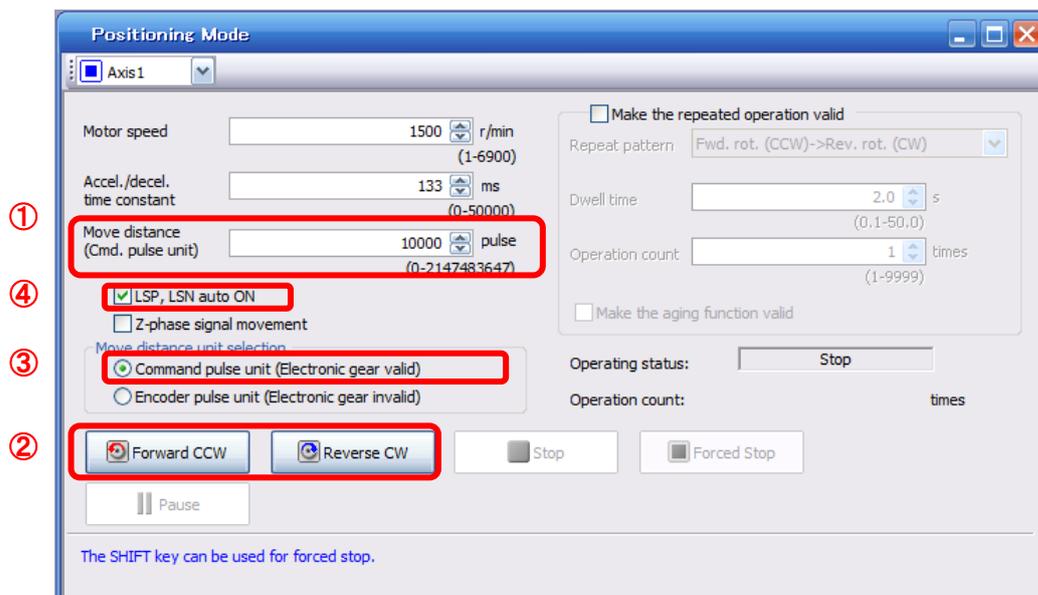
5.7 Saving/Loading Parameters

5.7.1 Saving Parameters

① From the "Parameter Setting" window in the setup software, select "Save As".

② Please specify location to be saved.

③ Please enter any file name.

④ Click "Save".

Files Saved

.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.)
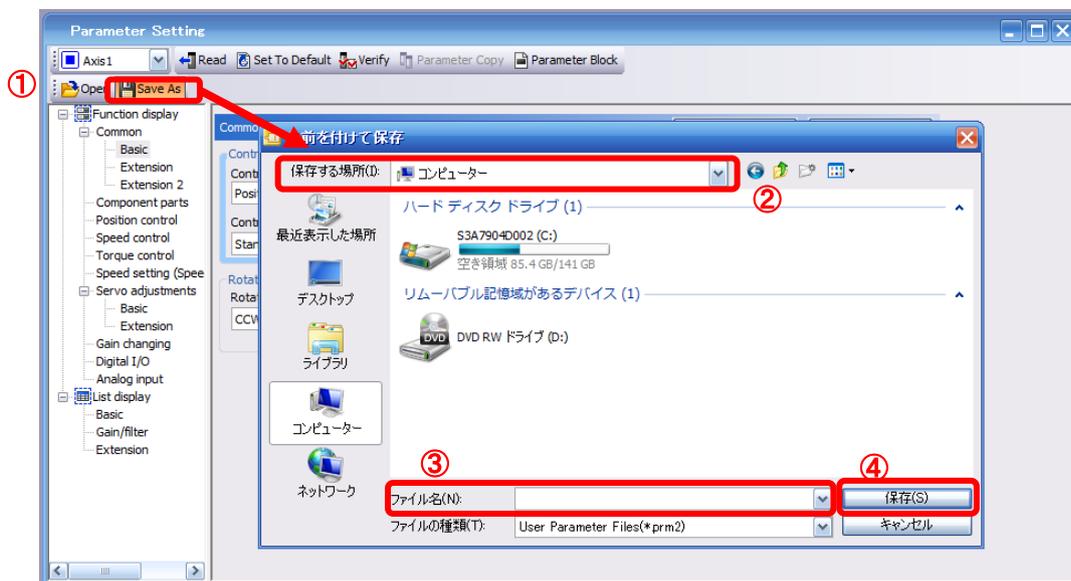
5.7.2 To Load saved Parameters

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.

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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.)

SMC
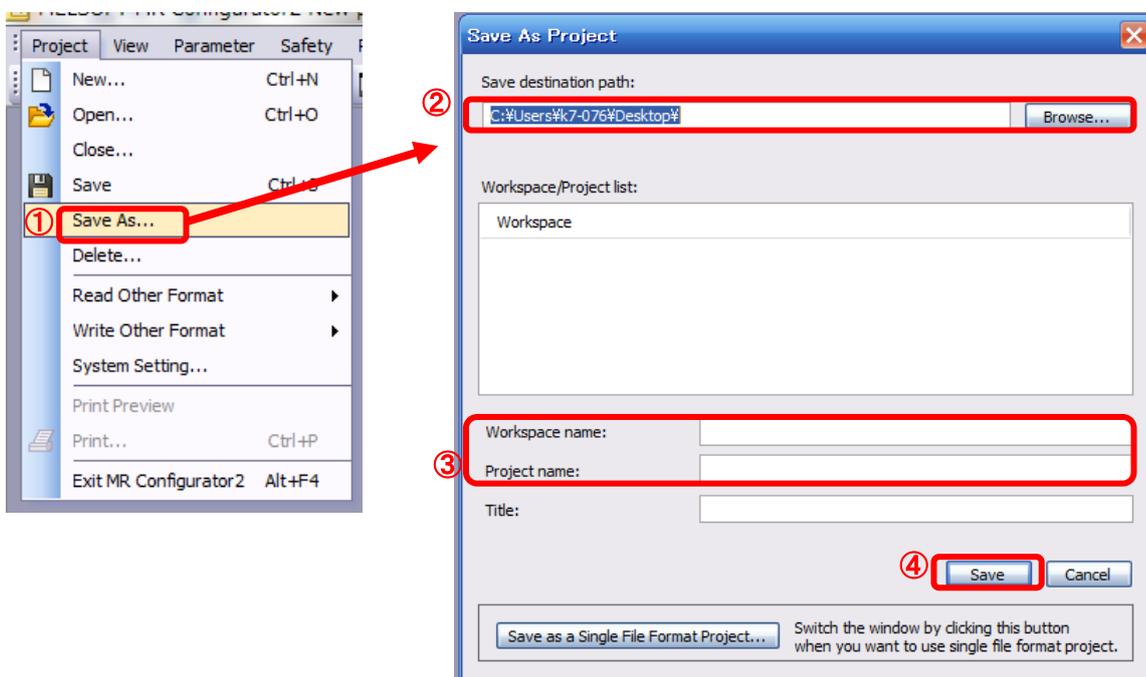
5.8.2 To Load saved Parameters

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.
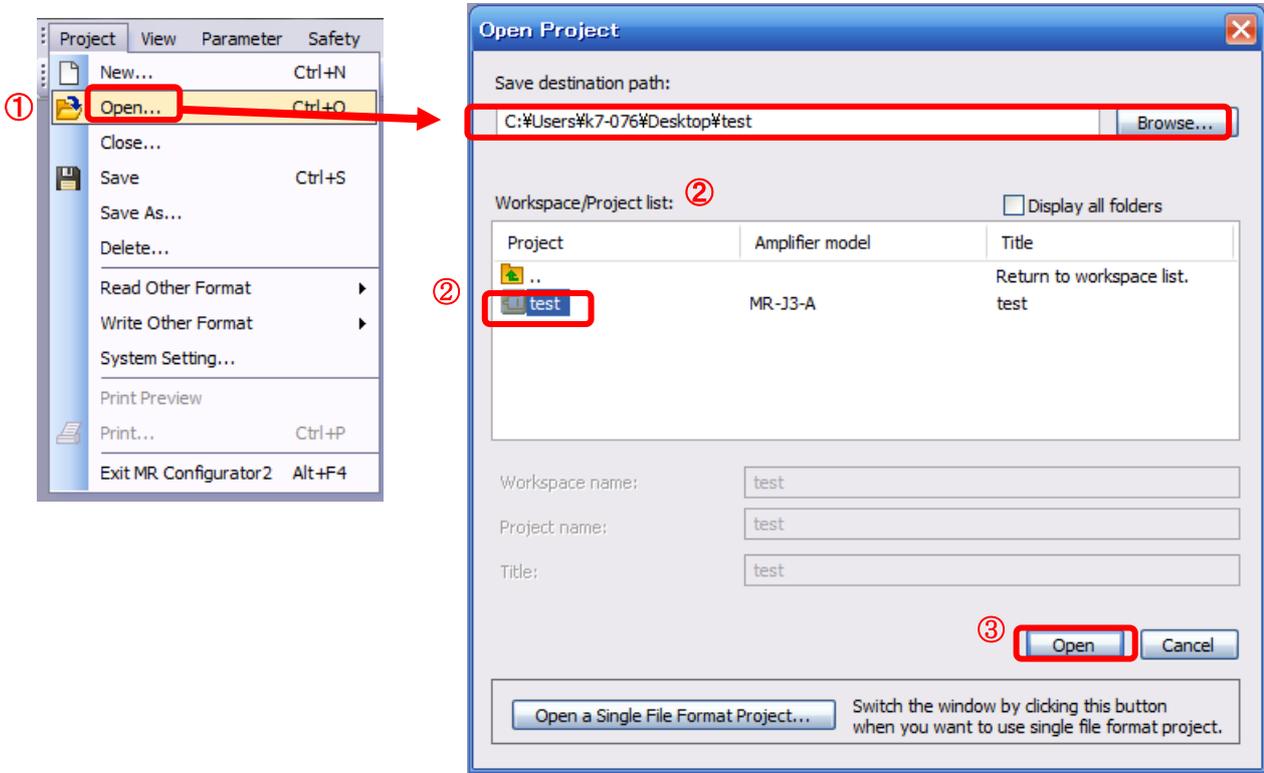
5.9 Acquisition of motion waveform with graph monitor

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.
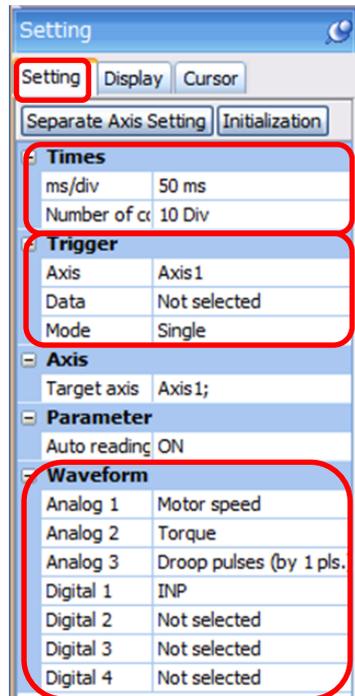
(1) Time

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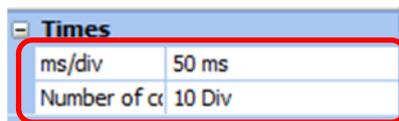
① Click " ⌄ " of [ms/div] and set the DiV number.

The unit ms of [Number of collection Div] is 1000ms＝1s.

② Click " ⌄ " of [Number of collection Div] and set the time.
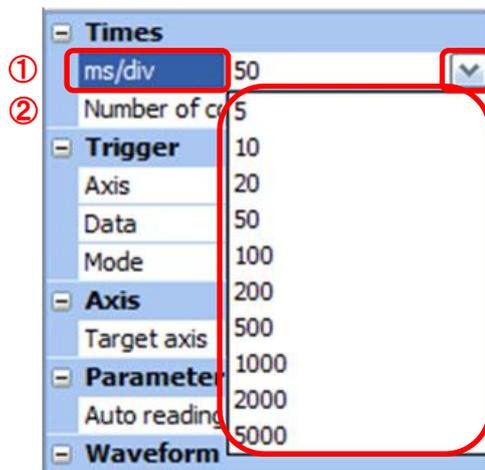
(2) Trigger

"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.)
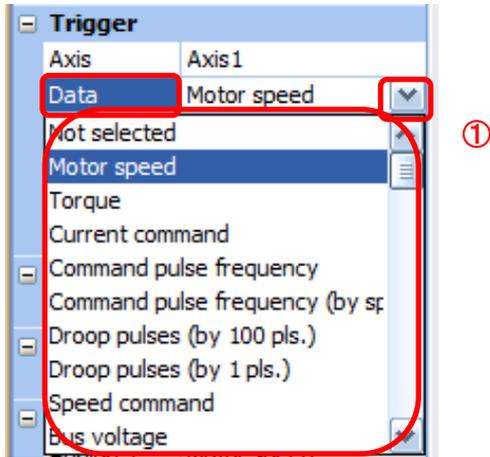
(3) "Level" / "Condition" / "Position" are displayed.
① Click " ⌄ " of "Level" / "Condition" to set the condition.
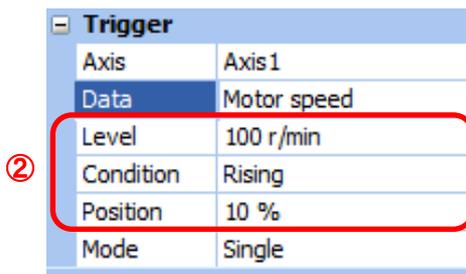
For Motor speed, when the operation direction is positive, "Level" should be100 and when the operation direction is negative, "Level" should be -100.
Align the setting of "Condition" to the operation direction too.

"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%.

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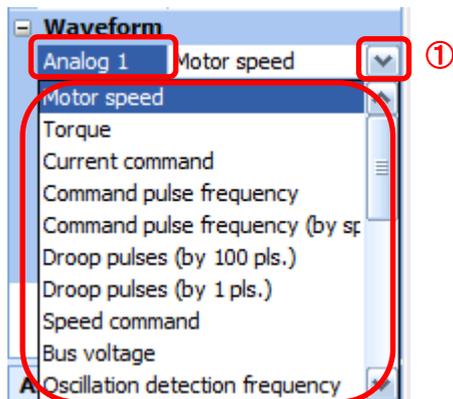
The analogue and digital waveforms that can be set with LECSB are shown below.
■Analogue waveform

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.

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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.)

① Click the "Start" button.
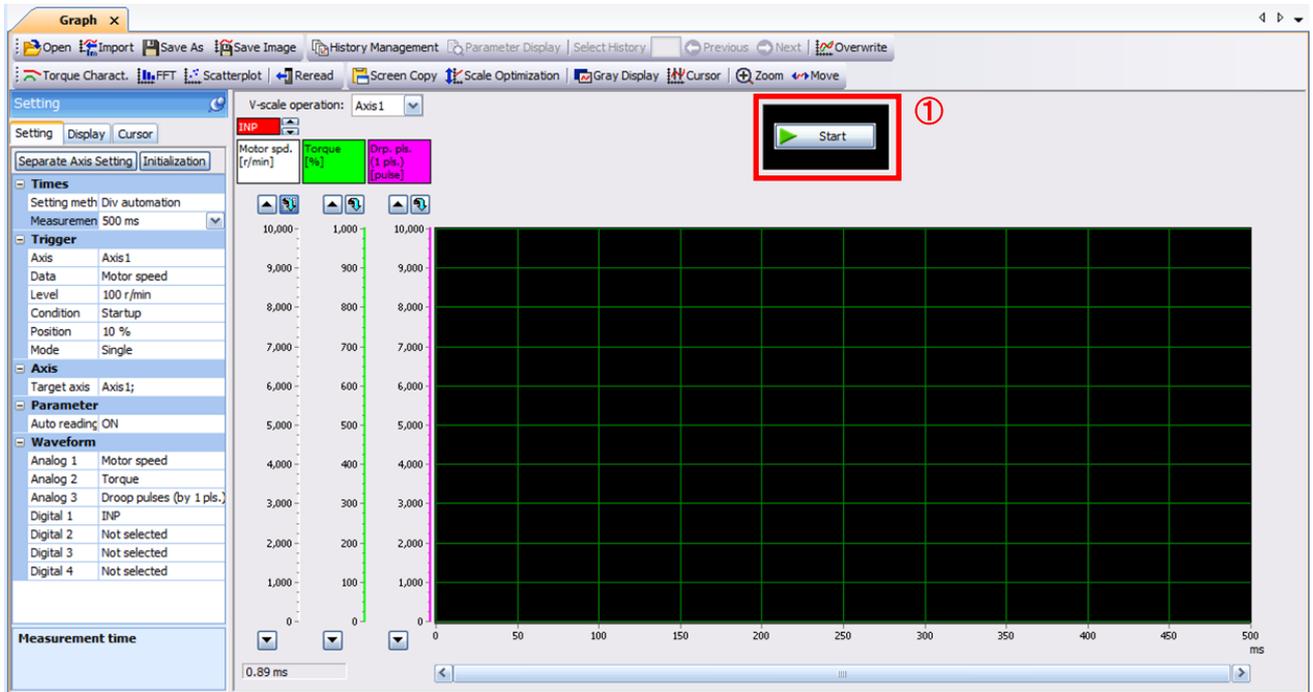
② Trigger wait is displayed.
③ The acquisition of waveform will be canceled with "Stop" button.
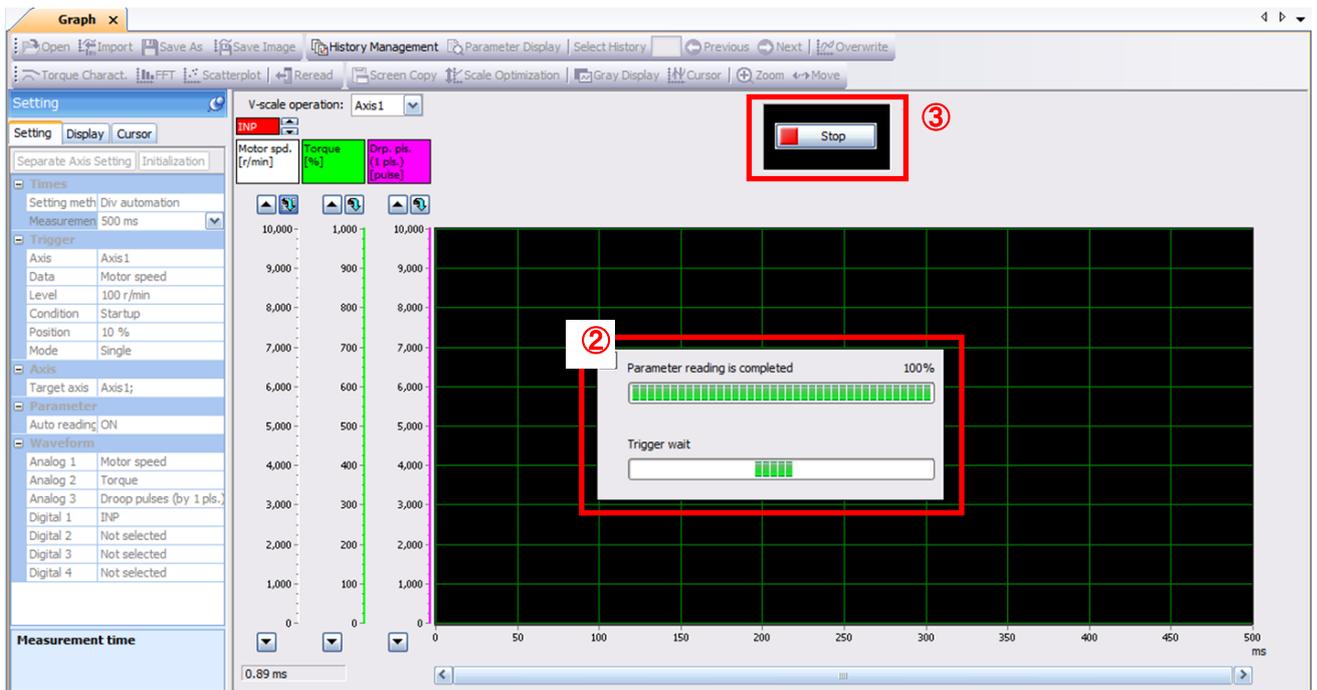
5.9.3 Operation Instruction

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.

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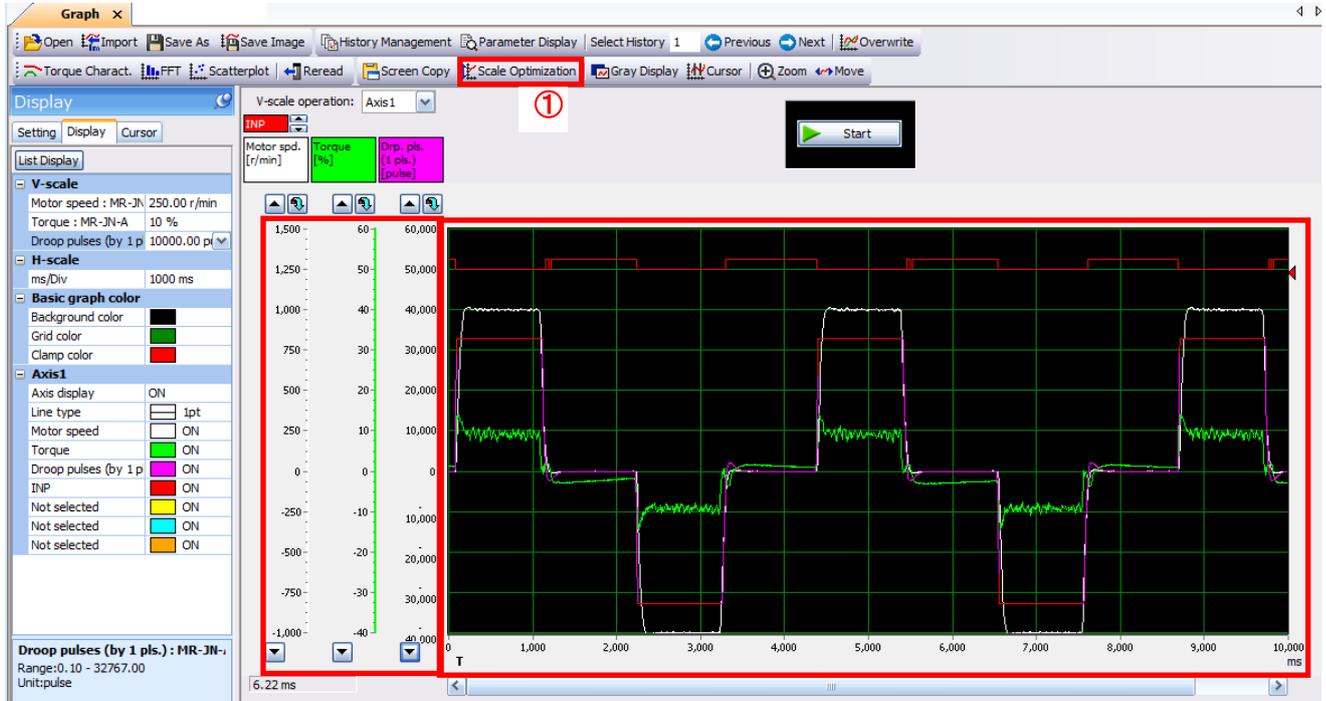
5.9.4 Saving of waveform

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

① 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.

③ Click the "Screen Copy" button.
   Save the displayed waveform screen (print screen).
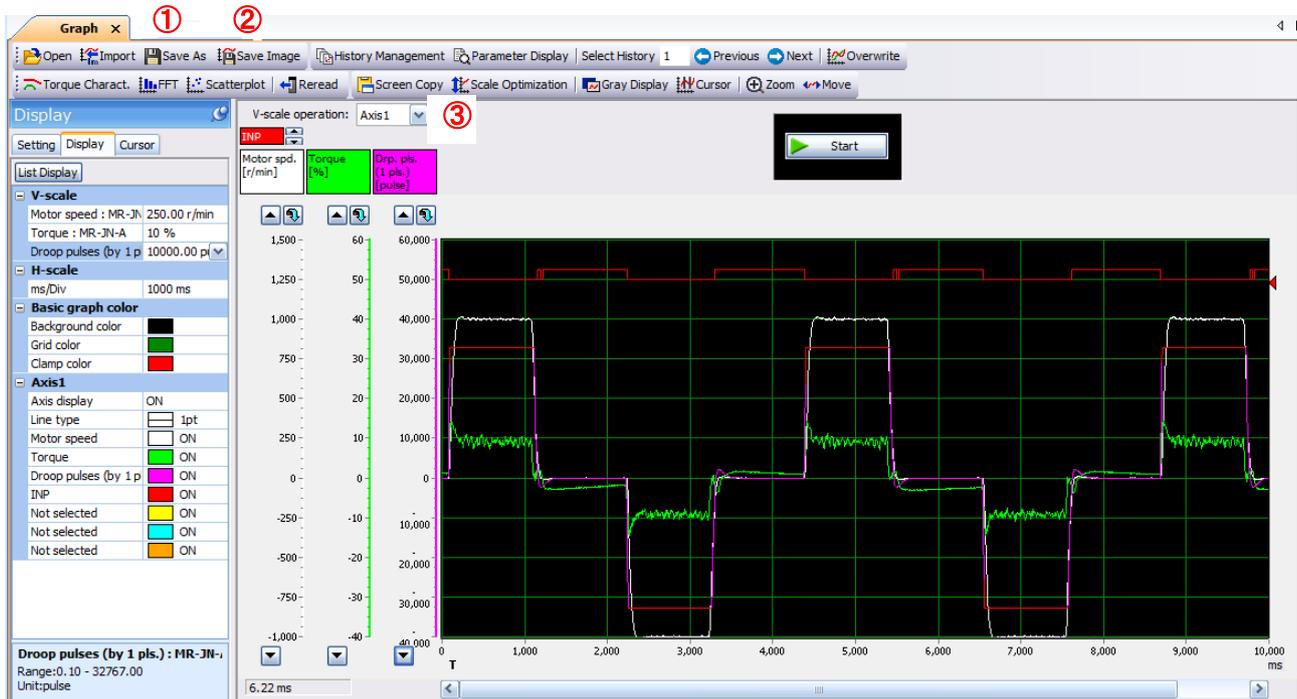
5.10 Display All Monitor List

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.
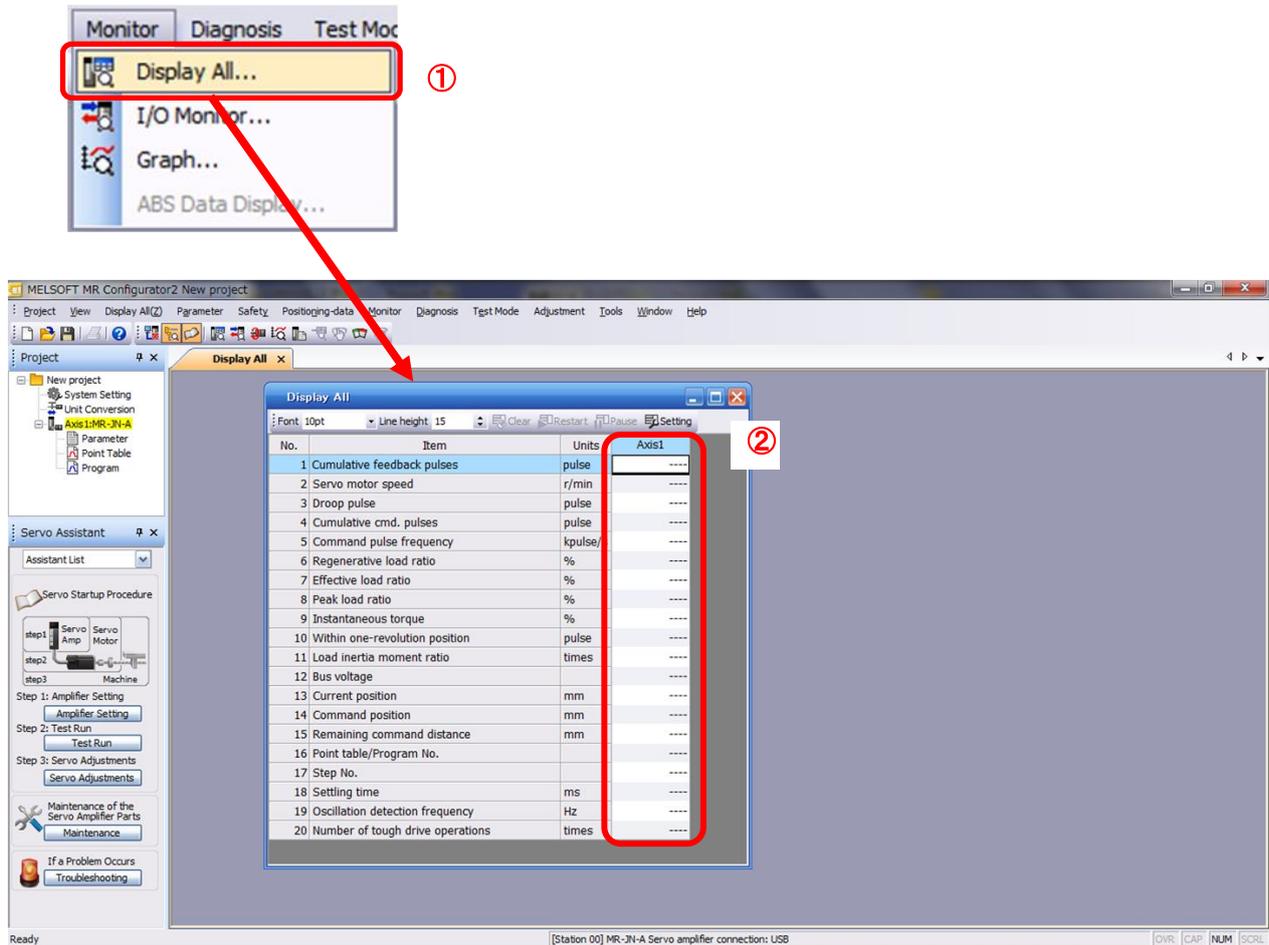
The following items are displayed for LECSB.

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.	-999999999 to 999999999	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.	-999999999 to 999999999	pulse

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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. Reverse rotation is indicated by a minus (-) sign.	-999999999〜999999999	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.	-999999999〜999999999	kpulse/s
6	Analog speed command voltage	Speed control mode The input voltage of analog speed command (VC) is displayed.	-10.00 〜 +10.00	V
	Analog speed limit voltage	Torque control mode The input voltage of analog speed limit (VLA) is displayed.		
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

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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.
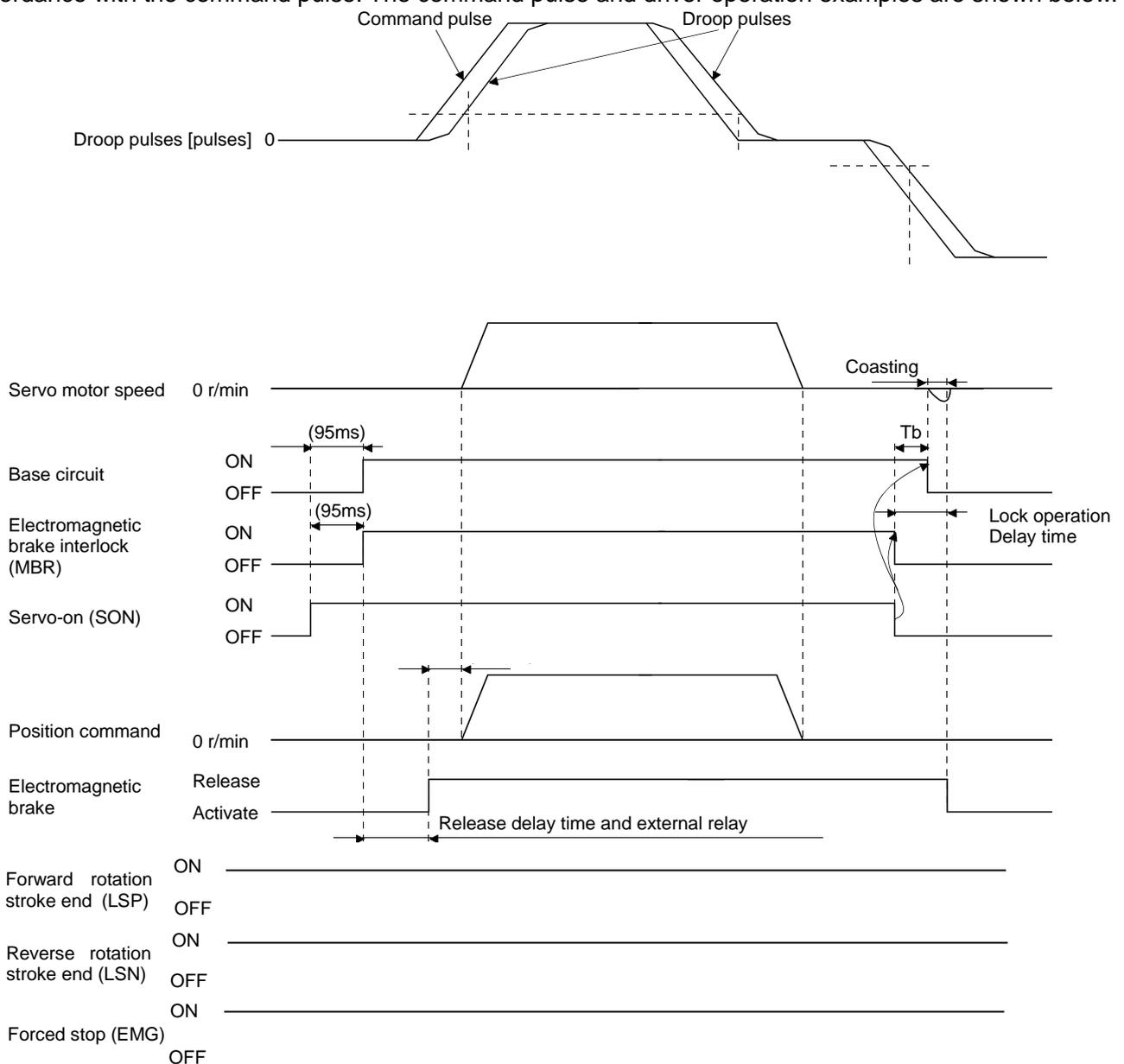
7.2 Speed control mode

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 ±10V with initial setting. The speed at ±10V can be changed using parameter
No.PC12.
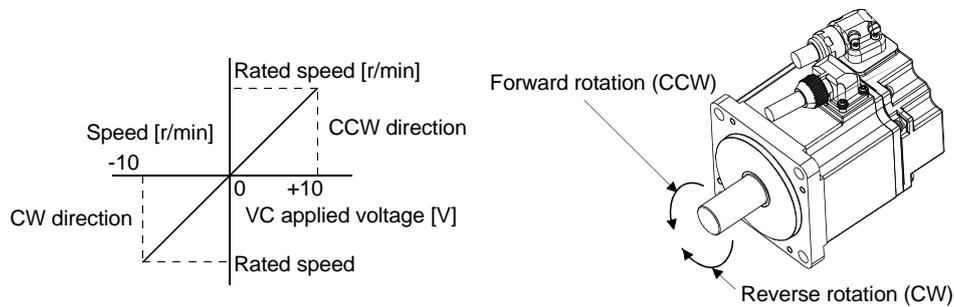
The following table indicates the rotation direction according to forward rotation start (ST1) and reverse rotation
start (ST2) combination.

(Note 1) Input device		(Note 2) Rotation direction			
ST2	ST1	Analog speed command (VC)			Internal speed commands
		+ Polarity	0V	− Polarity	
0	0	Stop (Servo lock)	Stop (Servo lock)	Stop (Servo lock)	Stop (Servo lock)
0	1	CCW	Stop (No servo lock)	CW	CCW
1	0	CW		CCW	CW
1	1	Stop (Servo lock)	Stop (Servo lock)	Stop (Servo lock)	Stop (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.
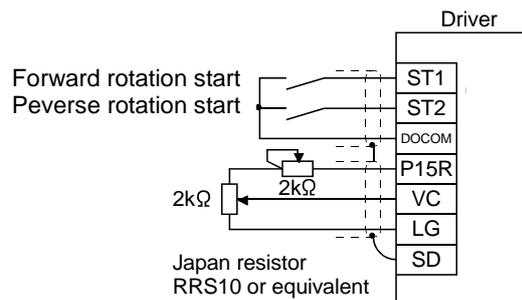
Refer to "LECSB Operation Manual", section 5.4 for assignment of signal.

LECSB speed command parameter setting

(Note) Input device			Speed command value	
SP3	SP2	SP1		
0	0	0	Analog speed command (VC)	Initial phase
0	0	1	Internal speed command 1 (parameter No.PC05)	
0	1	0	Internal speed command 2 (parameter No.PC06)	
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
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.

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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 $\pm8V$. Note that the torque at $\pm8V$ input can be changed with parameter No.PC13.
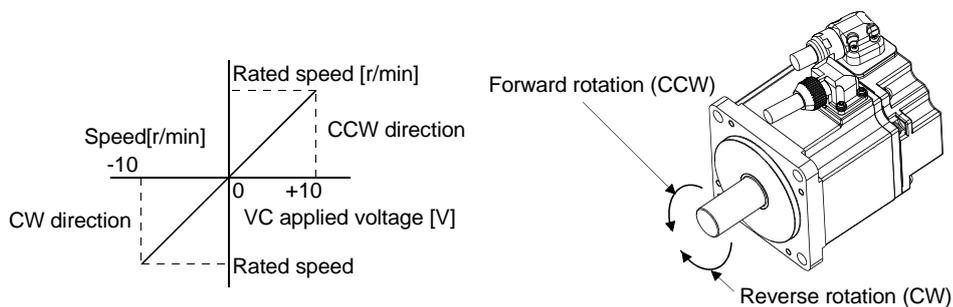
        The following table indicates the torque generation directions determined by the forward rotation selection (RS1) and reverse rotation selection (RS2) when the analog torque command (TC) is used.

(Note) Input device		Rotation direction		
		Torque control command (TC)		
RS2	RS1	＋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.

Note. 0: off
     1: on

    In general make the connections shown below.
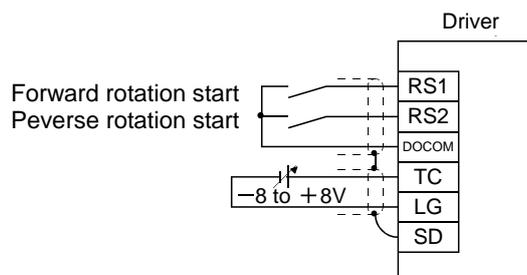
Refer to "LECSB Operation Manual", section 5.4 for assignment of signals.

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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 "□□□1" 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 ○ in the alarm deactivation column.

	Display	(Note 2) Alarm code CN122 (bit2)	CN123 (bit1)	CN124 (bit0)	Name	Alarm deactivation Power OFF→ON	Press "SET" on current alarm screen.	Alarm reset (RES)
Alarms	AL.10	0	1	0	Undervoltage	○	○	○
	AL.12	0	0	0	Memory error 1 (RAM)	○		
	AL.13	0	0	0	Clock error	○		
	AL.15	0	0	0	Memory error 2 (EEP-ROM)	○		
	AL.16	1	1	0	Encoder error 1 (At power on)	○		
	AL.17	0	0	0	Board error	○		
	AL.19	0	0	0	Memory error 3 (Flash-ROM)	○		
	AL.1A	1	1	0	Motor combination error	○		
	AL.20	1	1	0	Encoder error 2 (during runtime)	○		
	AL.21	1	1	0	Encoder error 3 (during runtime)	○		
	AL.24	1	0	0	Main circuit error	○	○	○
	AL.25	1	1	0	Absolute position erase	○		
	AL.30	0	0	1	Regenerative error	(Note 1) ○	(Note 1) ○	(Note 1) ○
	AL.31	1	0	1	Overspeed	○	○	○
	AL.32	1	0	0	Overcurrent	○		
	AL.33	0	0	1	Overvoltage	○	○	○
	AL.35	1	0	1	Command pulse frequency alarm	○	○	○
	AL.37	0	0	0	Parameter error	○		
	AL.45	0	1	1	Main circuit device overheat	(Note 1) ○	(Note 1) ○	(Note 1) ○
	AL.46	0	1	1	Servo motor overheat	(Note 1) ○	(Note 1) ○	(Note 1) ○
	AL.47	0	1	1	Cooling fan alarm	○		
	AL.50	0	1	1	Overload 1	(Note 1) ○	(Note 1) ○	(Note 1) ○
	AL.51	0	1	1	Overload 2	(Note 1) ○	(Note 1) ○	(Note 1) ○
	AL.52	1	0	1	Error excessive	○	○	○
	AL.8A	0	0	0	Serial communication time-out	○	○	○
	AL.8E	0	0	0	Serial communication error	○	○	○
	88888				Watchdog	○		

	Display	Name
Warnings	AL.92	Battery cable disconnection warning
	AL.96	Home position setting error
	AL.99	Stroke limit warning
	AL.9F	Battery warning
	AL.E0	Excessive regeneration warning
	AL.E1	Overload warning 1
	AL.E3	Absolute position counter warning
	AL.E5	ABS time-out warning
	AL.E6	Servo emergency stop warning
	AL.E8	Cooling fan speed reduction warning
	AL.E9	Main circuit off warning
	AL.EA	ABS servo on warning
	AL.EC	Overload warning 2
	AL.ED	Output watt excess warning

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.)

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