Doc No. DOC1015792
NN57170401

Operation Manual
(Simplified Edition)

PRODUCT NAME

AC Servo Motor Driver
(Pulse input type/Positioning type)

MODEL / Series / Product Number

LECSB2-T□ Series

**This product can be used by adding "MR Configurator2 dedicated file for LECSB-T"
to Setup software (MR Configurator2™ :LEC-MRC2□).
This is an additional file that is absolutely necessary when setting the LECSB-T with MR Configurator2™.
Please download the dedicated file from SMC website.
When connecting LECSB-T with MR Configurator2™, select MR-J4-A-S099(□) as the model.
For SMC products and SMC purchased products, please contact the SMC sales office.**

SMC Corporation

Contents

LECSB2-T□ 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)*1), and other safety regulations.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1:Robots
etc.

Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate 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.
1. 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.
2. 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.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. SMC products cannot be used beyond their specifications. They are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not allowed.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, combustion equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

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.

LECSB2-T□ Series / Driver Safety Instructions

⚠ Caution

SMC develops, designs, and manufactures products to be used for automatic control equipment, and provides them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not allowed.
Products SMC manufactures and sells cannot be used for the purpose of transactions or certification specified in the Measurement Act of each country.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

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

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. 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.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) 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

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Introduction

When using the LECSB2-T□, prepare the "LECSB2-T☐ Operation Manual" and use it together.
For the handling and details of equipment other than this driver, please refer to the manual of the equipment you are using.

Check that the main circuit power supply (AC200V) and control power supply (AC200V) are wired. .
For wiring, refer to " LECSB2-T☐ Operation Manual, Chapter 3.1" and " LECSB2-T☐ Operation Manual (Simplified Edition) , Chapter 3 ".

Check the EM2 (forced stop 2) wiring or parameter to release EM2 (operable).
EM2 can be forcibly set to automatic ON with a parameter only for the positioning mode .
Other than positioning mode, EM2 can not be forcibly set to automatic ON with parameters.
Sure to set the EM2 wiring to the ON : EM2 release (operable) state.

When setup software (MR Configurator 2™) is used, it is necessary to select the LECSB2-T□ model.
Select "MR-J4-A-S099(□)" *1) through Project (P) - "New (N)" - "Model".

*1) This product can be used by adding "MR Configurator2 dedicated file for LECSB-T" to Setup software(MR Configurator2™:LEC-MRC2☐).
Please download the dedicated file from SMC website.
"LECSB2-T□ Operation Manual, section 17.1 " for how to add and operate dedicated files.

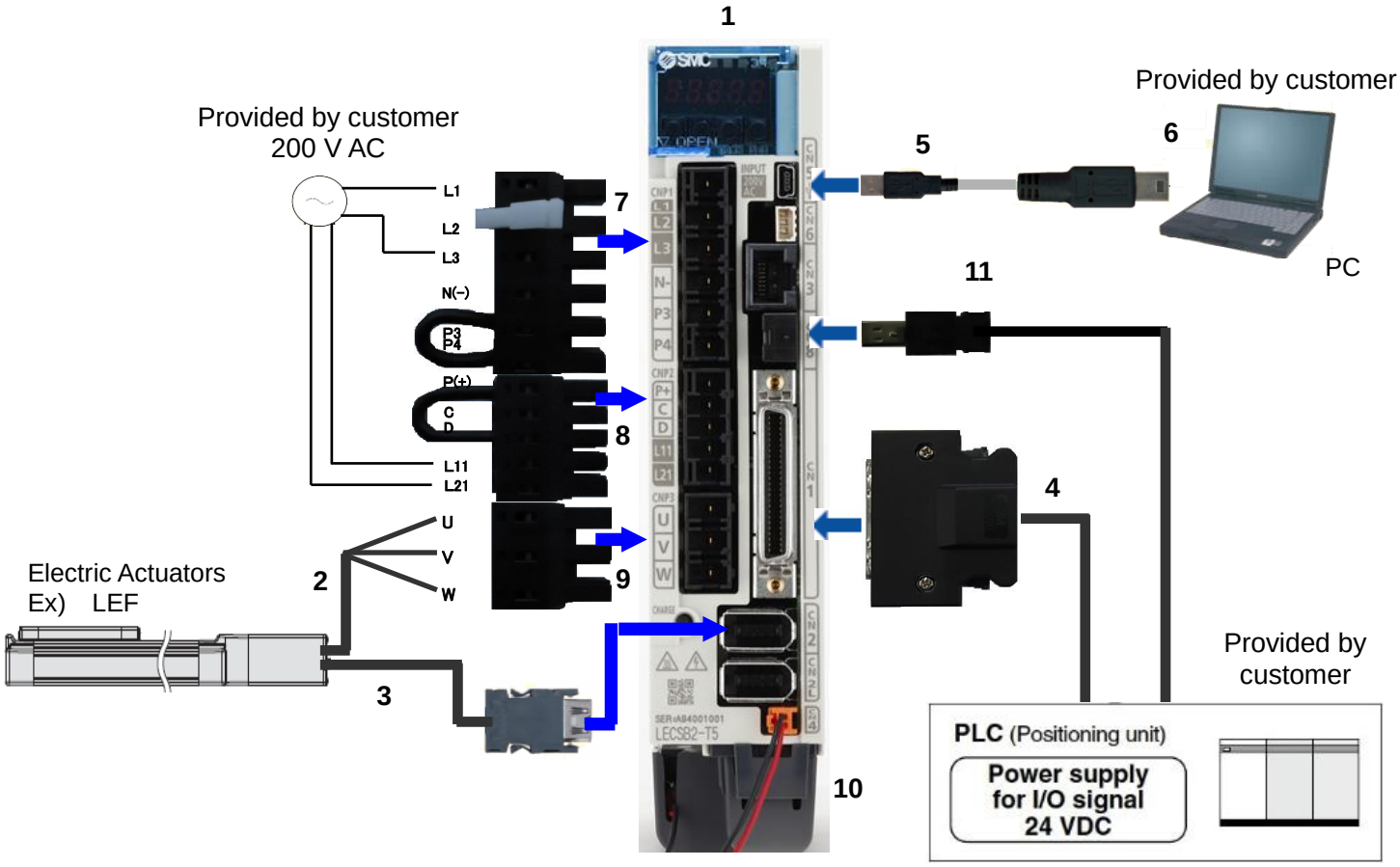
Terms

Position control mode (pulse input)	Positioning is performed by controlling the rotation speed and direction of the motor with a pulse train.
Speed control mode	Runs at the set rotation speed using parameters or analog input commands.
Torque control mode	Operation is executed with the set output torque by the analog input command.
Positioning mode (point table)	Position data, rotation speed, acceleration/deceleration time constant, etc. are set in the point table of the driver, and I/O signal ON/OFF control positioning operation is executed. (Up to 255 points can be used in the point table.)
Positioning mode (program method)	Multiple operation method settings are preset in the driver as steps with program, and I/O signal ON/OFF control positioning operation is executed. (The maximum number of steps is 640.)
Positioning mode (equally divided indexing method) (Note)	Presetting the number of equal divisions of 360 degrees for one rotation of the machine end, and I/O signal ON/OFF control positioning operation is executed. (Maximum number of divisions: 255 divisions)
Positioning mode (pushing operation)	A series of operations from positioning to pushing operation is executed using the positioning mode of point table.

Note) The positioning mode (equally divided indexing method) is not described in this Operation Manual (Simplified Edition).
When using the positioning mode (equally divided indexing method), refer to ``LECS B2 -T□ Operation Manual, Chapter 16.17 ".

1. Configuration

Equipment and wiring needed to get started.

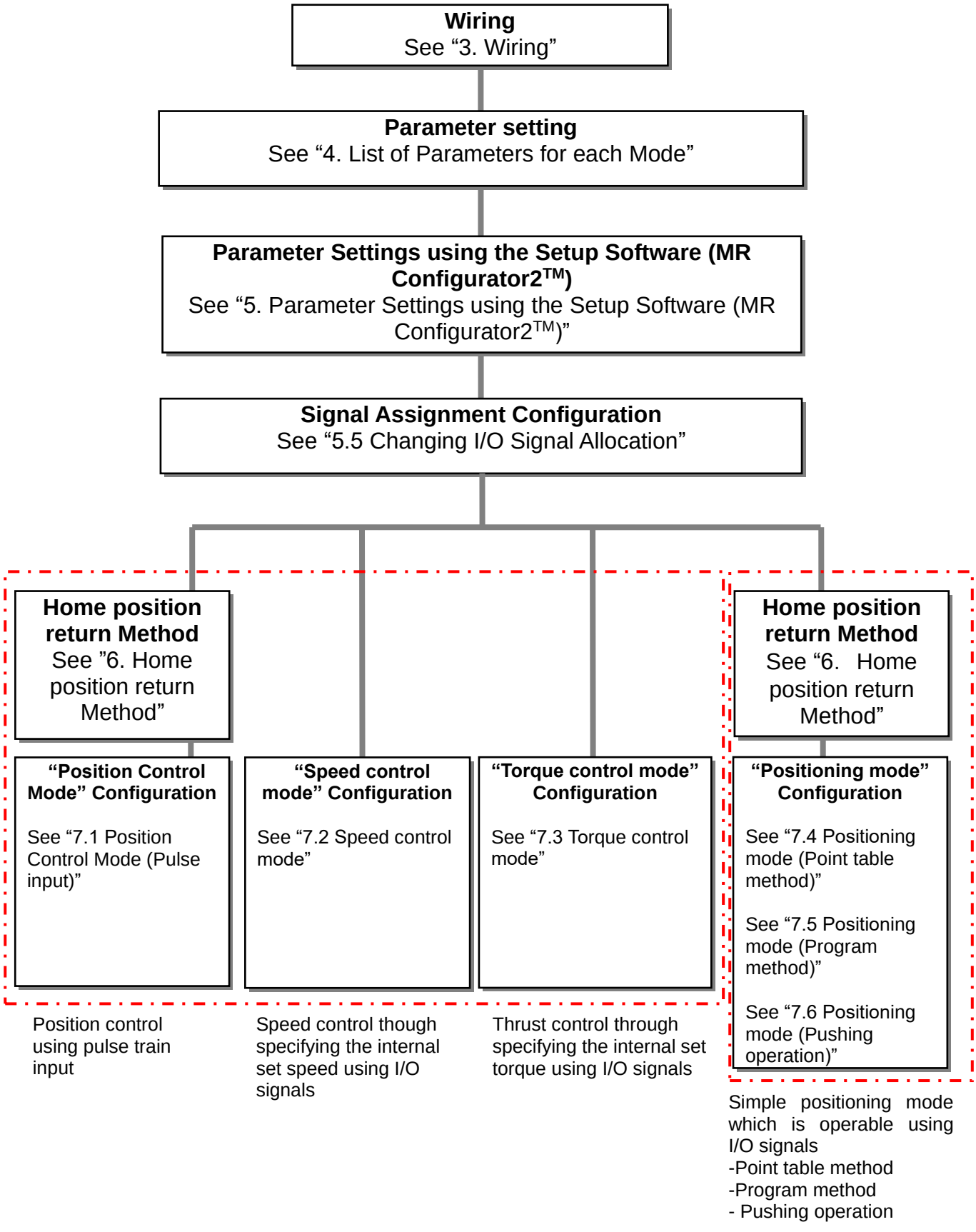


1	Driver	LECSB2-T*
2	Motor cable	LE-CSM-***
3	Encoder cable	LE-CSE-***
4	I/O connector	LE-CSNB
	I/O cable	LEC-CSNB-1
5	USB cable	LEC-MR-J3USB
6	Setup software (MR Configurator2™)	LEC-MRC2*
7	Main circuit power supply connector	CNP1 (Accessory)
8	Control circuit power supply connector	CNP2 (Accessory)
9	Motor connector	CNP3 (Accessory)
10	Absolute battery	LEC-MR-BAT6V1SET (included) Not required if used in an incremental system
11	STO cable	LEC-MR-D05UDL3M

Note) The optional lock cable is not shown in this drawing.
For details, refer to the "LECSB2-T□ Operation Manual".

2. Pre-Operation Procedure

2.1 Flow chart



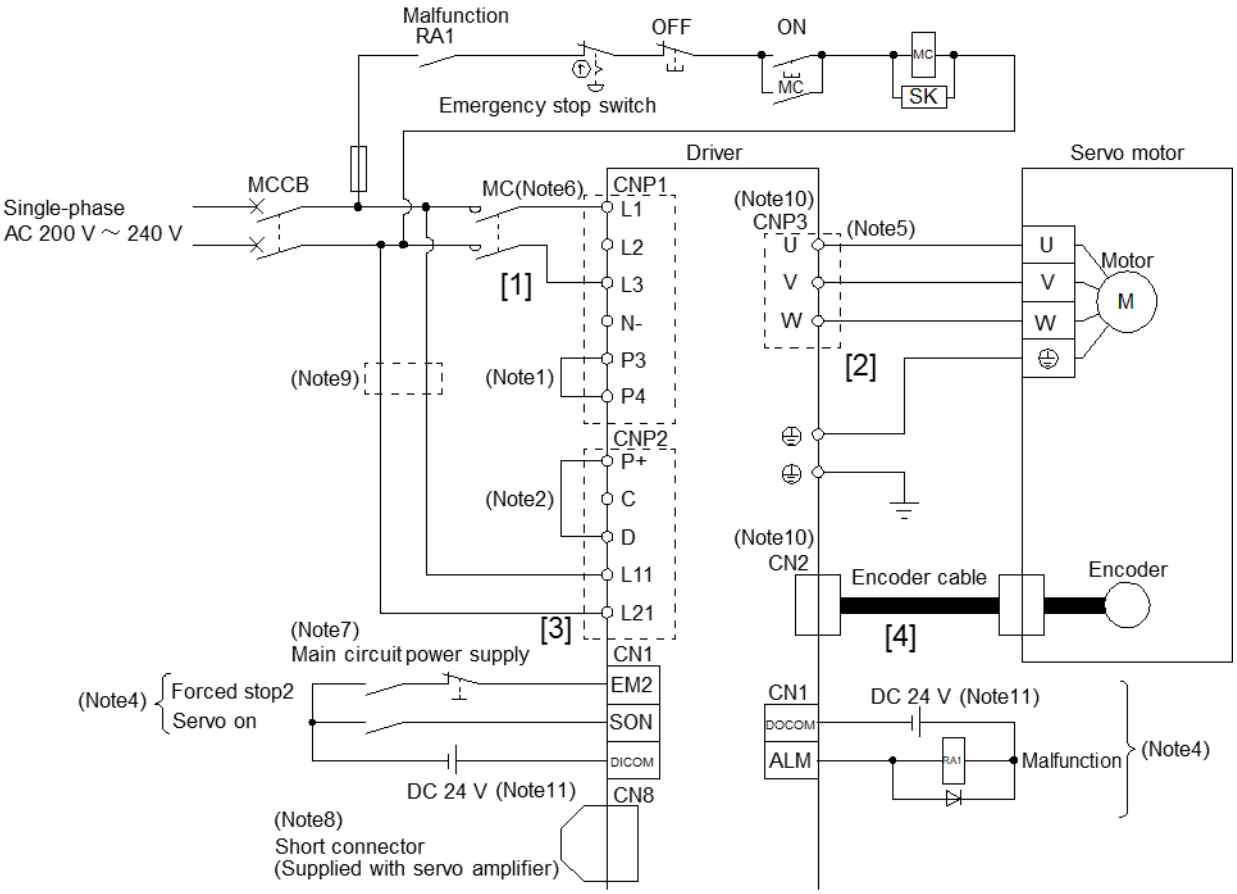
3. Wiring

3.1 Power Supply Wiring

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

(1) LECSB2-T☐ (Absolute encoder)

Example) When the power supply voltage is AC200V single-phase/sink input/output interface



[1] Power supply input terminals: Supply specified power (single -phase AC200 to 240V) to L_1 and L_3.

[2] - Connect the power input terminals (U, V, W) of the motor to the power terminals (U, V, W) of the driver.
- Connect the ground terminal of the motor to the ground terminal of the driver.
- Connect the encoder cable.

[3] Connect the single -phase AC200 to 240V external power supply to the power supply for control circuit.

[4] Connect the DC24V power supply to the interface power supply.

Refer to "LECSB2-T□ Operation Manual, Chapter 3" when the power supply voltage is 3-phase AC200V or source I/O interface.

Note
1. P3 and P4 are already connected at the time of shipment.
2. Always connect between P+ and D. (Wiring is completed at the time of shipment.)
4. This is for the sink I/O interface.
6. Use a magnetic contactor with an operation delay time (the time from when current flows through the operation coil until the contact closes) of 80 ms or less. Depending on the voltage of the main circuit and the operation pattern, the bus voltage may drop and the deceleration may shift to dynamic brake deceleration during forced stop deceleration. If you do not want dynamic brake deceleration, delay the time to turn off the magnetic contactor.
7. To prevent an unexpected restart of the driver, configure a circuit that turns off EM2 when the main circuit power is turned off.
8. When not using the STO function, attach the short-circuit connector that comes with the driver.
9. If the wire used for L11 and L21 is thinner than the wire used for L1 and L3, use a no-fuse circuit breaker.
10. Do not connect the servo motor of the wrong axis to U, V, W and CN2 of the driver as it may cause malfunction.
11. For convenience, the DC24 V power supplies for input signals and output signals are shown separately, but they can be configured with a single unit.

3.2 Connection of I/O signals

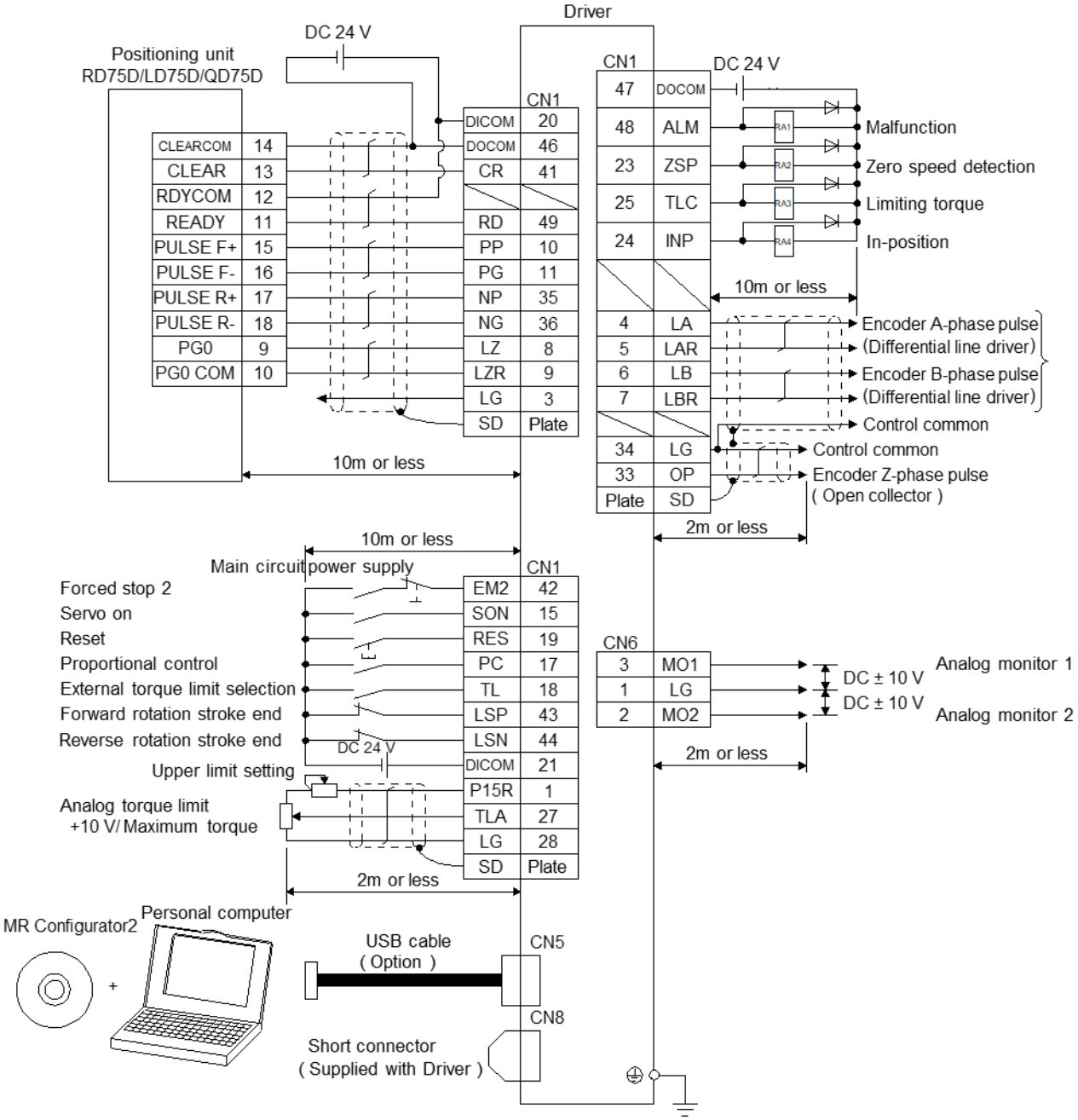
An example of connecting the input/output signals of the driver is shown.

3.2.1 Position control mode (sink input/output interface)

(1) Connection example

An example of connection in position control mode is shown below.

This connection example is for use with Mitsubishi Electric Corporation's PLC/positioning unit (RD75D/LD75D/QD75D) when used in position control mode.
When connecting with other PLCs/positioning units, please check the "LECSB2-T☐ instruction manual" and the technical data/manuals of the PLC and positioning unit you are using.



For the source I/O interface, please refer to "LECSB2-T□ Operation Manual Chapter 3.2.1 (2)".
For notes and wiring details, please refer to "LECSB2-T□ Operation Manual Chapter 3.2.1 (1)".
For input/output signals, refer to "LECSB2-T□ Operation Manual (Simplified Edition), Chapter 3.2.1 (2), (3)". For details, refer to "LECSB2-T□ Operation Manual Chapter 3.5".

(2) Input signal

Position control mode: P, Speed control mode: S, Torque control mode: T,
Positioning mode (Point table method): CP, Positioning mode (Program method): CL

●: Automatic ON can be set ○: Initial setting △: Assignment is available with parameter −: Assignment is not available

Symbol	Device name	Automatic ON	P	S	T	CP/ CL	Function
PP	Forward rotation pulse train (Sink)	-	○	-	-	-	1) For open collector method Maximum input frequency is 200 kpulses /s. For A-phase and B-phase pulse trains, 200 kpulses /s is the frequency after multiplication by 4. a) For sink input interface Input a forward pulse train between PP and DOCOM. Input a reverse pulse train between NP and DOCOM. b) For source input interface Input a forward rotation pulse train between PP2 and PG. Input reverse pulse train between NP2 and NG. 2) For differential receiver method Maximum input frequency is 4 Mpulses /s. For A-phase and B-phase pulse trains, 4 Mpulses /s is the frequency after multiplication by 4. Input a forward pulse train between PG and PP. Input a reverse pulse train between NG and NP.
NP	Reverse rotation pulse train (Sink)	-	○	-	-	-	
PP2	Forward rotation pulse train (Source)	-	○	-	-	-	
NP2	Reverse rotation pulse train (Source)	-	○	-	-	-	
PG	Differential forward rotation pulse train	-	○	-	-	-	
NG	Differential reverse rotation pulse train	-	○	-	-	-	
EM2	Forced stop 2	−/● Note)	○	○	○	○	Forced stop state can be canceled by turning ON EM2. EM1 is an exclusive function, EM2/EM1 are the same connector pins.
EM1	Forced stop 1	-	△	△	△	△	Unlike EM2, it does not decelerate and forcibly stops.
SON	Servo-on	●	○	○	○	○	When SON is turned ON, operation becomes possible.
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.
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 command rotation speed during operation is selected.
SP2	Speed selection 2	-	-	○	○	-	
SP3	Speed selection 3	-	-	△	△	-	
CR	Clear	-	○	-	-	△	When turned ON, the droop pulse is erased.

●: Automatic ON can be set ○: Initial setting △: Assignment is available with parameter －: Assignment is not available

Symbol	Device name	Automatic ON	P	S	T	CP/ CL	Function
DI0	Point table No/ Program No. selection 1	●	-	-	-	○	Select point table, program and return to home position mode with DI0 to DI7.
DI1	Point table No/ Program No selection 2	●	-	-	-	○	
DI2	Point table No/ Program No selection 3	●	-	-	-	○	
DI3	Point table No/ Program No selection 4	●	-	-	-	○	
DI4	Point table No/ Program No selection 5	●	-	-	-	△	
DI5	Point table No/ Program No selection 6	●	-	-	-	△	
DI6	Point table No/ Program No selection 7	●	-	-	-	△	
DI7	Point table No/ Program No selection 8	●	-	-	-	△	
MD0	Automatic/manual selection	●	-	-	-	○	When this signal turns on, automatic operation mode is activated. When this signal turns off, manual operation mode is activated.

Note) In other than positioning mode, EM2 (Forced stop 2) cannot be forcibly set to automatic ON.
Be sure to set the EM2 wiring to the ON: EM2 release (operable) state.

(3) Output signal

Position control mode: P, Speed control mode: S, Torque control mode: T,
Positioning mode (Point table method): CP, Positioning mode (Program method): CL

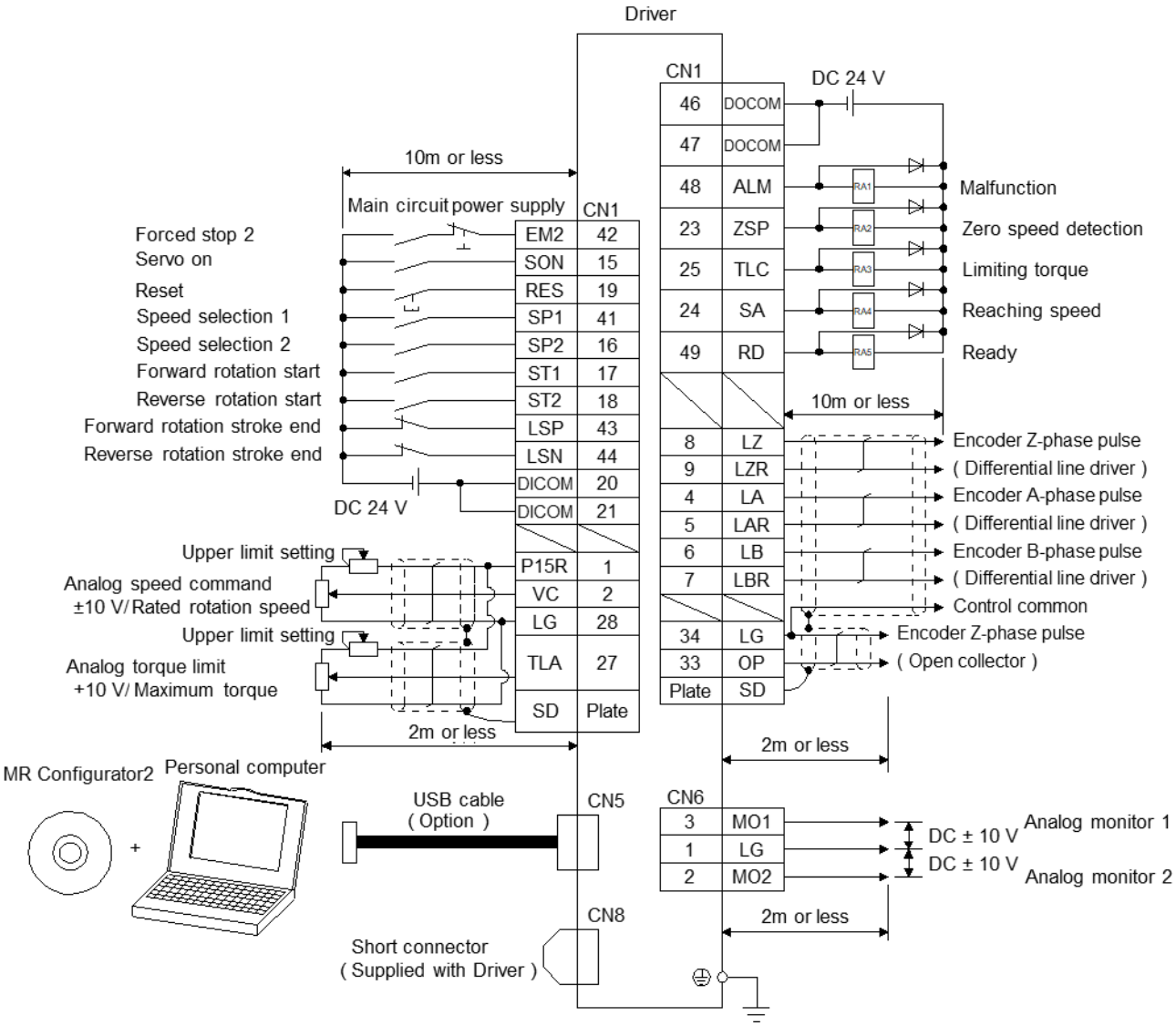
○: Initial setting △: Assignment is available with parameter －: Assignment is not available

Symbol	Device name	P	S	T	CP/ CL	Function
ALM	Malfunction	○	○	○	○	This signal turns off while alarm is generated.
RD	Ready	○	○	○	○	When servo-on turns on and operation is available, this signal turns on.
INP	In-position	○	-	-	○	This signal turns on when the droop pulse is within the setting range.
SA	Speed command 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. .
ZSP	Zero speed detection	○	○	○	○	When the servo motor rotation speed is lower than the speed set by parameter, this signal turns on.
MBR	Electromagnetic brake interlock	△	△	△	△	This signal turns off in case of servo off or when alarm is generated.

3.2.2 Speed control mode (sink input/output interface)

(1) Connection example

An example of a connection for the speed control mode is shown below. Connect wires as necessary.

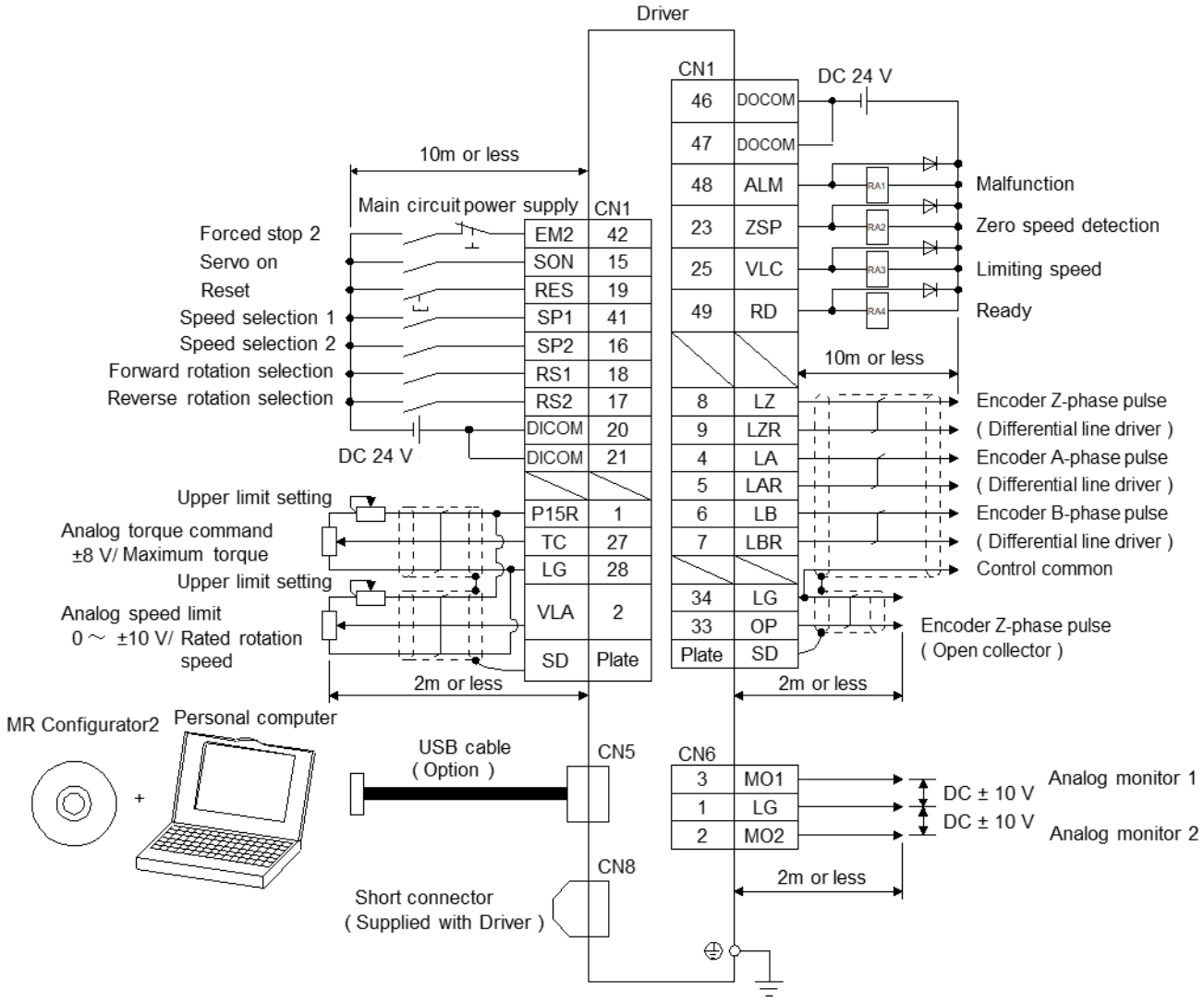


For the source I/O interface, refer to "LECSB2-T☐ Operation Manual Chapter 3.2.2 (2)".
For notes and wiring details, refer to "LECSB2-T☐ Operation Manual Chapter 3.2.2".
For input/output signals, refer to "LECSB2-T Operation manual (simplified version), chapter 3.2.1 (2), (3)".
For details, refer to "LECSB2-T☐ Operation Manual Chapter 3.5".

3.2.3 Torque control mode (sink input/output interface)

(1) Connection example

An example of a connection for the torque control mode is shown below. Connect wires as necessary.

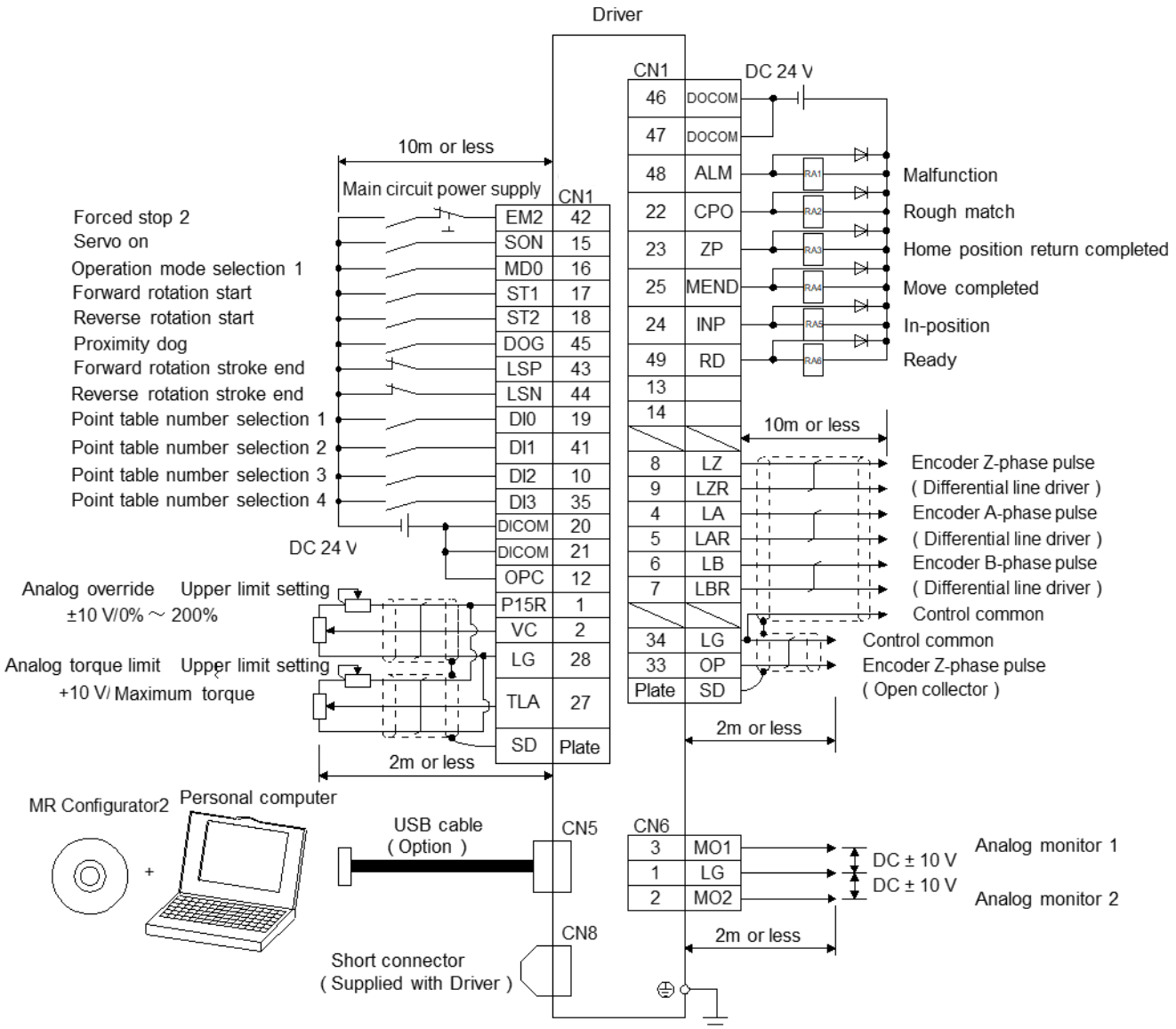


For the source I/O interface, please refer to "LECSB2-T☐ Operation Manual Chapter 3.2.3 (2)".
For notes and wiring details, refer to "LECSB2-T☐ Operation Manual Chapter 3.2.3".
For input/output signals, refer to "LECSB2-T Operation manual (simplified version), chapter 3.2.1 (2), (3)".
For details, refer to "LECSB2-T☐ Operation Manual Chapter 3.5".

3.2.4 Positioning Mode (Sink I/O Interface)

(1) Connection example

An example of a connection for the positioning mode (point table) is shown below. Connect wires as necessary.



For the source input/output interface, refer to "LECSB2-T☐ Operation Manual Chapter 3.9".
For notes and wiring details, refer to "LECSB2-T☐ Operation Manual Chapter 16.2.1 (1)".
For programming method, please refer to "LECSB2-T☐ Operation Manual Chapter 16.2.1 (2)".
For the equal division indexing method, please refer to "LECSB2-T☐ Operation Manual Chapter 16.2.1 (3)".
For the pushing operation, refer to "LECSB2-T☐ Operation Manual Chapter 17.2".
For input/output signals, refer to "LECSB2-T Operation manual (simplified version), chapter 3.2.1 (2), (3)".
For details, refer to "LECSB2-T☐ Operation Manual Chapter 16.2.3".

4. Parameter List for each Mode

This is a parameter that needs to be set in each control mode. Set as necessary.
For details, refer to "LECSB2-T□ Operation Manual, Chapter 5" and "LECSB2-T□ Operation Manual (Simplified Edition), Chapter 5.3". For parameters other than this item, refer to "LECSB2-T □ Operation Manual, Chapter 5 ".

Setup software (MR Configurator2 ™: L EC-MRC2*) is always required to set parameters.

***1 Setup software 1.52E or higher is required.**
***2 Prepare the setup software (MR Configurator2™ : LEC-MRC2*) separately.**
***3 Prepare the USB cable (LEC-MR-J3USB) separately.**

4.1 Common to each mode

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

№	Abbreviation	name	initial value	unit
PA01	*STY	driving mode	1000h	
PA02	* REG	Regeneration option	0000h	

(2) [Input /output setting parameter (No. PD□□)]

This parameter is set when changing the allocation of input/output signals and when selecting automatic ON of input signals.
For details, refer to "LECSB2-T□ Operation Manual, Section 5.1.4" and "LECSB2-T□ Operation Manual (Simplified Edition), Section 5.5".

4.2 Position control mode

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

№	Abbreviation	name	initial value	unit
PA03	* ABS	Absolute position detection system	0000h	
PA06	CMX	Electronic gear numerator (command input pulse magnification numerator)	1	
PA07	CDV	Electronic gear denominator (command input pulse magnification denominator)	1	
PA08	ATU	Auto tuning mode	0001h	
PA09	RSP	Auto tuning responsiveness	16	
PA10	INP	In-position range	100	pulse
PA13	*PLSS	Command pulse input form	0100h	
PA14	*POL	Rotation direction selection	0	
PA21	*AOP3	Function selection A-3	0001h	

4.3 Speed control mode

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

№	Abbreviation	name	initial value	unit
PA08	ATU	Auto tuning mode	0001h	
PA09	RSP	Auto tuning responsiveness	16	

(2) [Extended setting parameter (No. PC□□)]

№	Abbreviation	name	initial value	unit
PC01	STAs	Velocity acceleration time constant	0	Ms.
PC02	STBs	speed 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
PC 09	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
PC12	VCM	Analog speed command Maximum rotation speed	0	r/min

4.4 Torque control mode

(1) [Extended setting parameter (No. PC□□)]

№	Abbreviation	name	initial value	unit
PC01	STAs	Velocity acceleration time constant	0	Ms.
PC02	STBs	speed 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
PC 09	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
PC13	TLC	Analog torque command maximum output	100.0	%

4.5 Positioning mode

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

№	Abbreviation	name	initial value	unit
PA03	* ABS	Absolute position detection system	0000h	
PA06	CMX	Electronic gear numerator (command input pulse magnification numerator)	1	
PA07	CDV	Electronic gear denominator (command input pulse magnification denominator)	1	
PA08	ATU	Auto tuning mode	0001h	
PA09	RSP	Auto tuning responsiveness	16	
PA10	INP	In-position range	100	pulse
PA14	*POL	Rotation direction selection	0	
PA21	*AOP3	Function selection A-3	0001h	

(2) [Positioning setting parameter (No. PT□□)]

№	Abbreviation	name	initial value	unit
PT01	*CTY	Command mode selection	0000h	
PT03	*FTY	Feed function selection	0000h	
PT04	*ZTY	Origin return type	0010h	
PT05	ZRF	Origin return speed	100	r/min
PT07	ZSTMore	Origin shift amount	0	μm _
PT08	*ZPS	Origin return position data	0	× 10 STM μm _
PT13	JOG	JOG speed	100	r/min
PT15	LMPL	Software limit +	0	× 10 STM μm _
PT16	LMPH			
PT17	*LMNL	Software limit -	0	× 10 STM μm _
PT18	*LMNH			

(3) [I /O setting parameter (No. PD□□)]

A) Point table

This parameter is set when changing the allocation of input/output signals and when using the point table with a maximum of 255 points.

For details, refer to "LECSB2-T Operation Manual (Simplified Edition), Section 5.5" and "LECSB2-T□ Operation Manual, Section 16.4.4".

B) Program method

This parameter is set when changing the assignment of input/output signals.

For details, refer to "LECSB2-T Operation Manual (Simplified Edition), section 5.5" and "LECSB2-T□ Operation Manual, Section 16.10.4 ".

C) Pushing operation

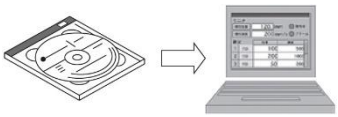
This parameter is set when changing the allocation of input/output signals and when using the point table with a maximum of 255 points.

For details, refer to "LECSB2-T Operation Manual (Simplified Edition), section 5.5", "LECSB2-T□ Operation Manual, section 17.7.2 ", and "LECSB2-T□ Operation Manual, section 17.9".

5. Parameter setting from setup software (MR Configurator2™)

The procedure for setting typical parameters from the setup software (MR Configurator2 ™: LEC-MRC2*) is explained. For details of parameters, refer to "LECSB2-T Operation Manual, Chapter 5 ".

5.1 Setup software (MR Configurator 2™)



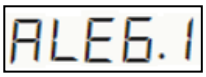
***1 Setup software version 1.52E or higher is required.**
***2 Prepare the setup software (MR Configurator2™: LEC-MRC2*) separately.**
***3 Prepare the USB cable (LEC-MR-J3USB) separately.**

5.1.1 Installation Method

" **MR Configurator2™** Operation Manual" in the " Setup Software (MR Configurator2™) " CD ("Manual¥ ib0300160 *.pdf ") to install the " setup software (MR Configurator2™) ".
After the installation is completed, a software called “MR Configurator2” will be added to your PC.

5.2 Driver basic settings for first commissioning

Turn on the main circuit power supply (AC 200V) and control power supply (AC 200V) of the LECSB2-T.
the driver display is as shown below, set the **EM2 (forced stop 2) wiring to ON : Forced stop canceled (operable).**

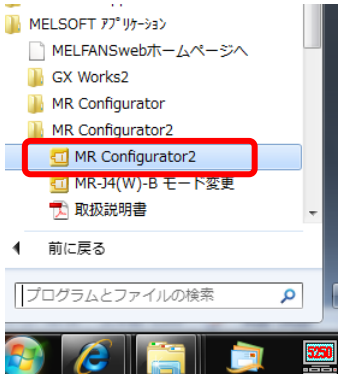


Refer to "LECSB2-T□ Operation Manual, Chapter 4 " when turning on the power for the first time.

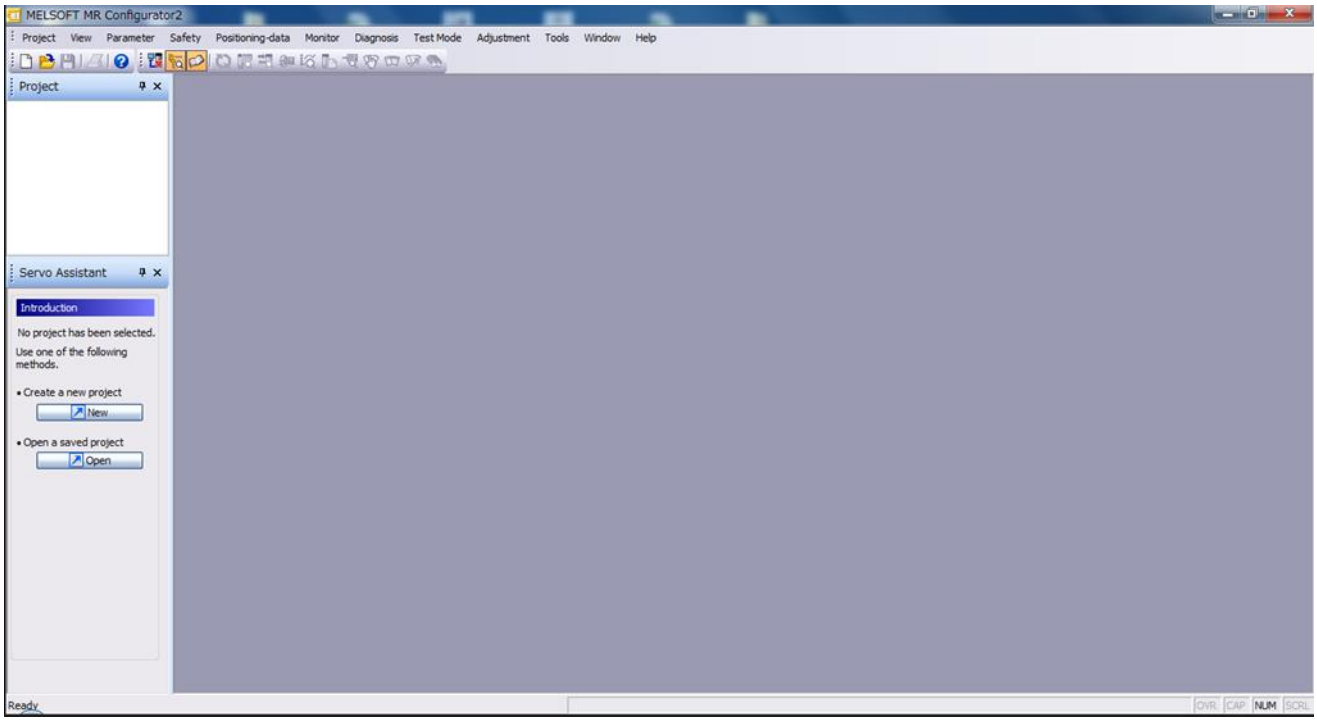
This product can be used by adding the "MR Configurator2 dedicated file for LECSB-T" to the setup software (MRConfigurator2TM: LEC-MRC2□).
Please download the dedicated file from our website.

5.2.1 Starting the setup software

(1) Connect the PC and LECSB2-T with a USB cable.
(2) Turn on the power of LECSB2-T.
(3) Start “ MR Configurator2 ”.

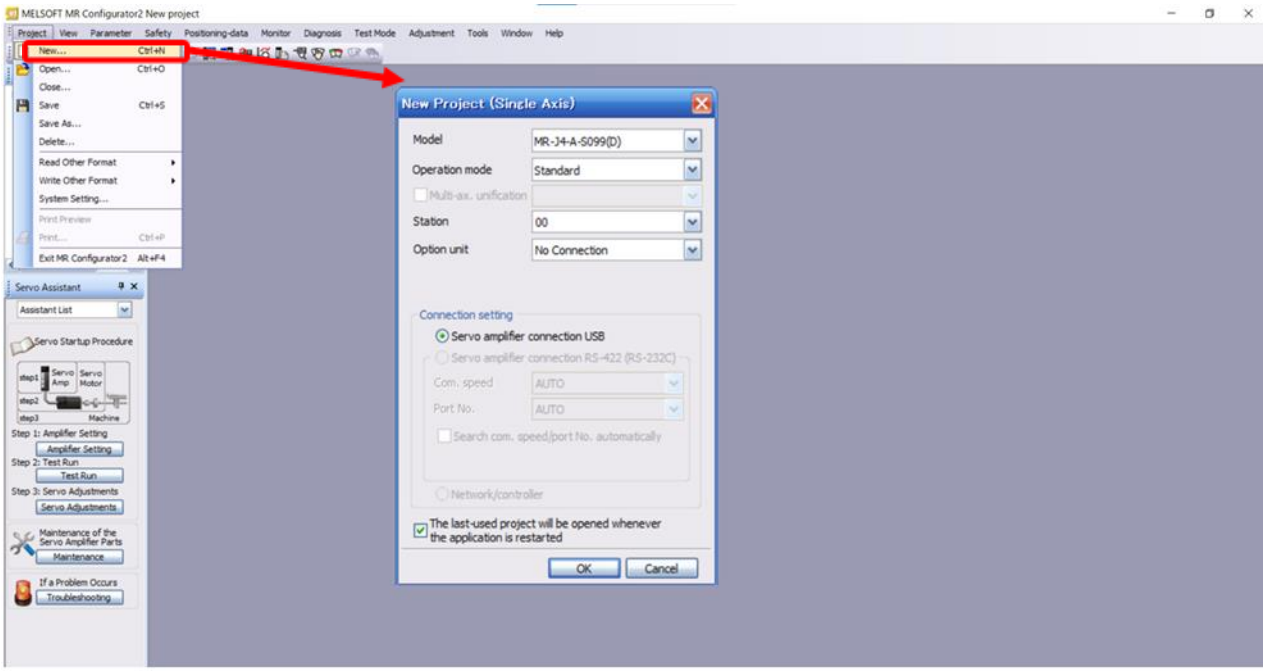


When it was started, the following window will be displayed.



5.2.2 System Settings

(1) Click "Project" - "New" in the setup software to display the "New" window.



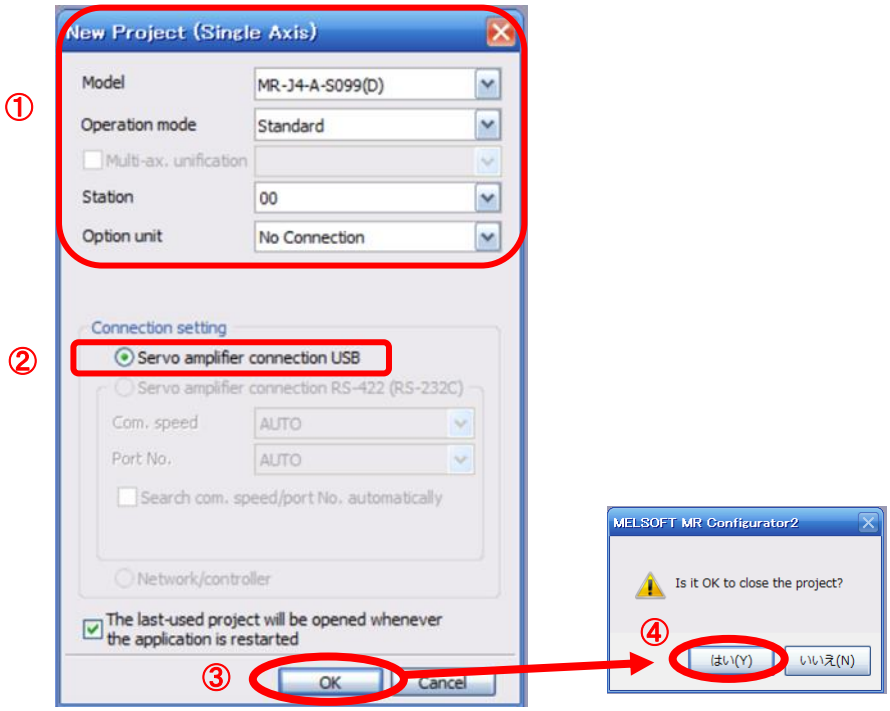
5.2.3 Model Selection

(1) Select " MR-J4-A-S099(□) **"** for the model.
- Select "Standard" in "Operation mode".
- Set the "station" for USB connection in "station". Match the station number set in parameter [PC20]. The initial value of parameter [PC20] is "0". When using for the first time or when the parameter [PC20] has not been changed from "0", set "00".
- Select "No Connection" in "Optional Unit".

(2) Select "Servo amplifier connection USB" for the destination setting.

(3) Click "OK".

(4) Click "Yes (Y)". Read parameters and create a project.



5.2.4 Driver ON LINE Check

Check that the driver is enabled (ONLINE).

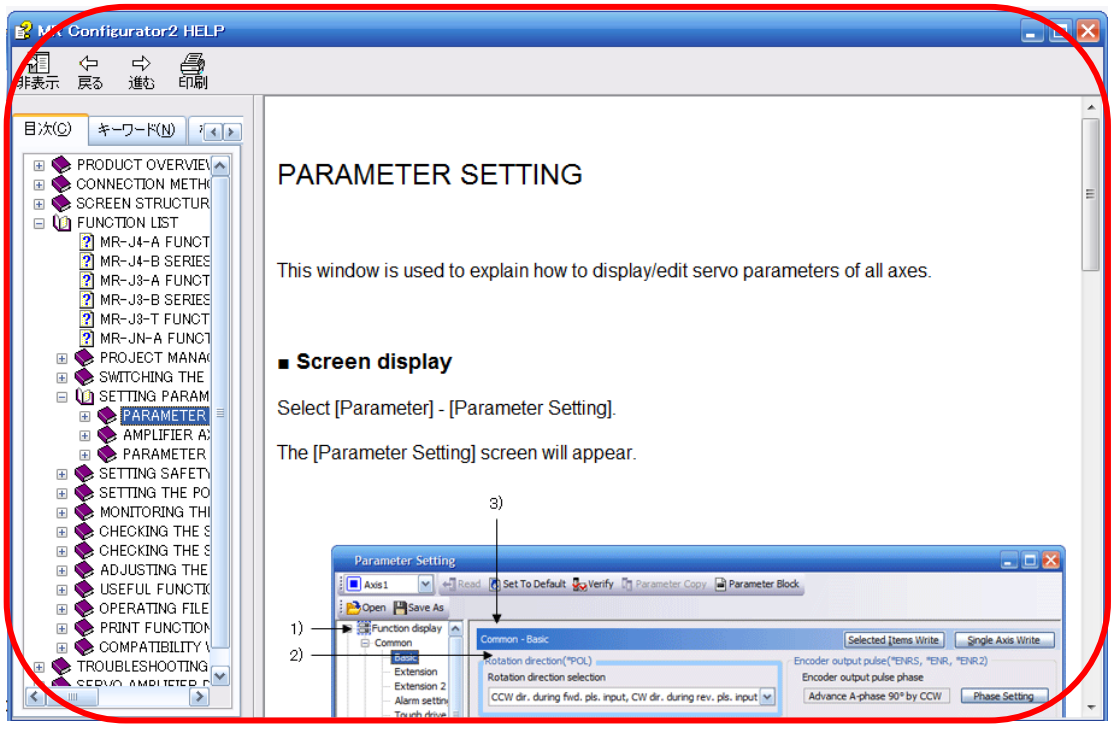
Check that the “ONLINE/OFFLINE” icon is displayed “  ”.

If“  ” is displayed, it is offline.

* If it is "Offline", communication between the PC and the driver is not possible. Please check the following points.
  - Is the power of the driver turned on?
  - Is the PC and the driver connected with a USB cable?
  - Is the USB driver installed?
  - Is the USB driver which is compliant to Windows version installed?
  - Is the setting of “Port” for USB connection corresponding?
    Match the station number set in parameter [PC20].
    The initial value of parameter [PC20] is "0".
    When using for the first time or when the parameter [PC20] has not been changed from "0", set "00".
    Select "No Connection" in "Optional Unit".

5.2.5 Help Function

If you click "Help (H)" - "MR Configurator2 Help (H)" in each window of the setup software, the "Help" window corresponding to each window will be displayed.



5.3 Parameter setting (Driver side)

Setup software (MR Configurator2 TM: L EC-MRC2*) is always required to set parameters.

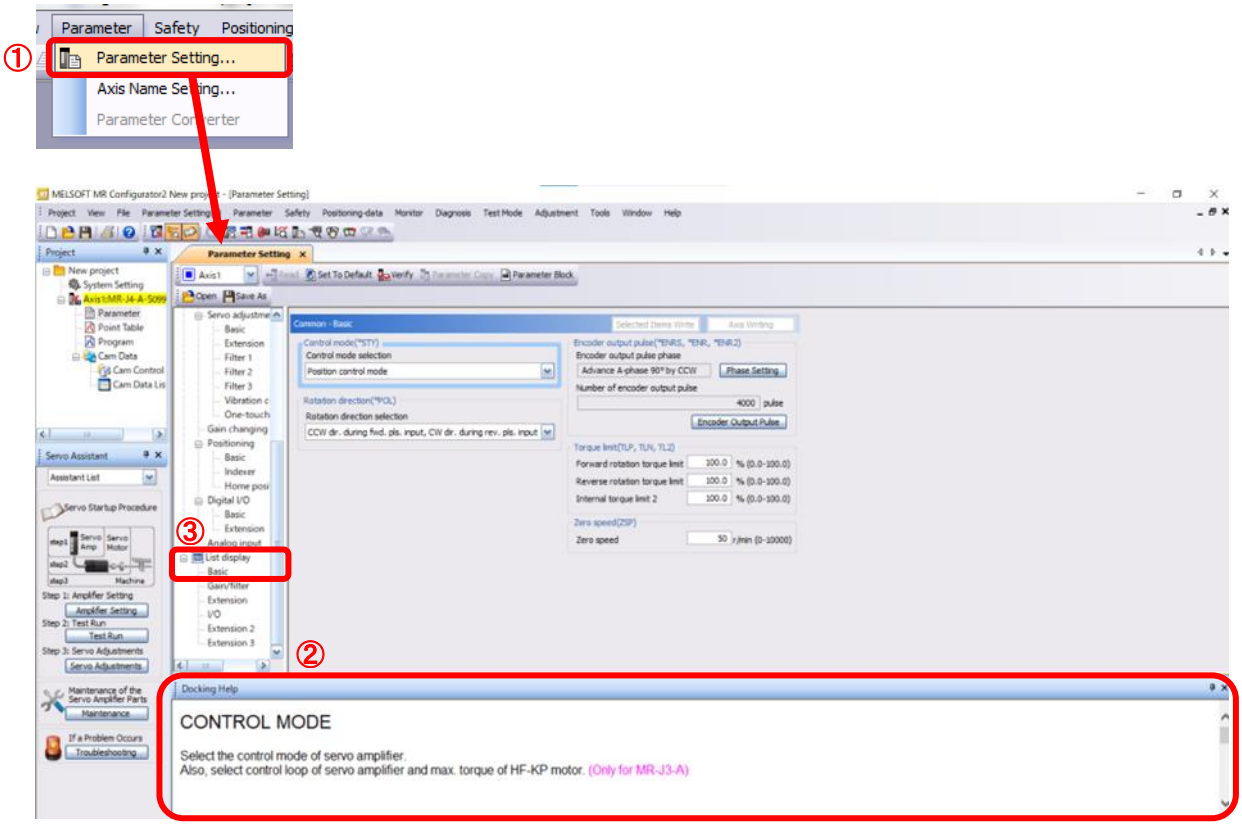
***1 Setup software 1.52E or higher is required.**

***2 Prepare the setup software (MR Configurator2TM : LEC-MRC2*) separately.**

***3 Prepare the USB cable (LEC-MR-J3USB) separately.**

(1) Click "Parameter" - "Parameter Setting" from “View” on the menu bar. The "Parameter Setting" window will be displayed.

(2) The explanation of each parameter item is displayed in "MR2 Help".
(If it is not displayed, click "View" - "Docking Window" - "Docking Help" from “View” on the menu bar.)



(3) Clicking each item in the "List Display" displays the "Parameter List" window corresponding to each item.
If you select "Basic", it will be displayed as follows.

Basic — Selected Items Write | Axis Writing

No.	Abbr.	Name	Unit	Setting range	Axis1
PA01	*STY	Operation mode		1000-1268	1000
PA02	*REG	Regenerative option		0000-73FF	0000
PA03	*ABS	Absolute position detection system		0000-0002	0000
PA04	*AOP1	Function selection A-1		0000-2000	2000
PA05	*FBP	Number of command input pulses per revolution		1000-1000000	10000
PA06	CMX	Elec. gear numerator (Cmd. pls. mult. factor num.)		1-16777215	1
PA07	CDV	Elec. gear denominator (Cmd. pls. mult. factor den.)		1-16777215	1
PA08	ATU	Auto tuning mode		0000-0004	0001
PA09	RSP	Auto tuning response		1-40	16
PA10	INP	In-position range		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		0000-0412	0100
PA14	*POL	Rotation direction selection		0-1	0
PA15	*ENR	Encoder output pulse	pulse/rev	1-4194304	4000
PA16	*ENR2	Encoder output pulse 2		1-4194304	1
PA17	*MSR	Servo motor series setting		0000-FFFF	0000
PA18	*MTY	Servo motor type setting		0000-FFFF	0000
PA19	*BLK	Parameter block		0000-FFFF	00AB

For details of each parameter, refer to "LECSB2-T□ Operation Manual, Chapter 5".

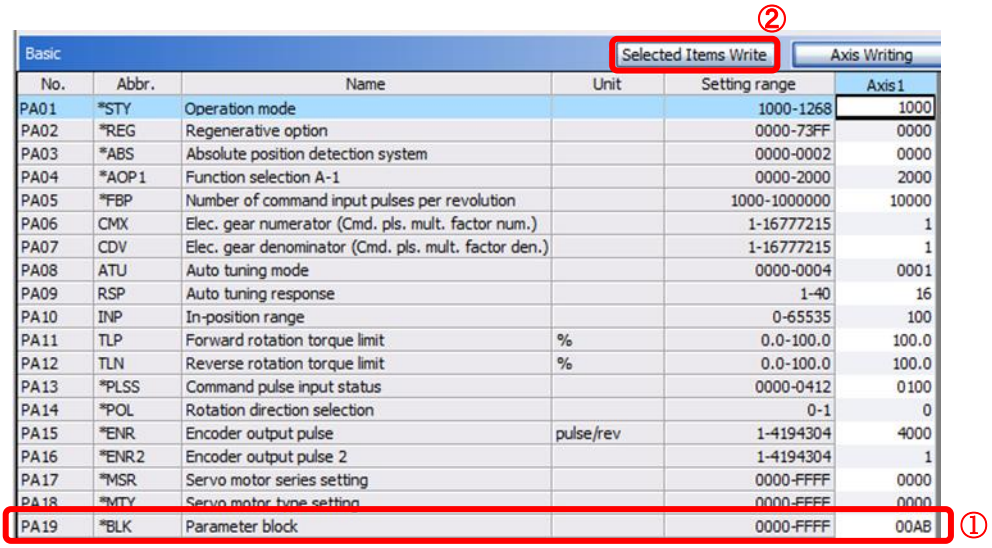
5.3.1 Change Parameter Block

Enable setting of all parameters.

(1) "PA19" to "00AB" in "Basic Settings".

(2) the cursor to " PA19" and click the "Selected Items Write" button.

(3) **Turn off the power and then turn it on again. parameters will be enabled.**



(4) **Be sure to click "Read".**

Note the following points when changing each parameter.

Note1: Among the various parameters, there are some that are **"enabled by turning off the power once and then turning on again after setting"**. (The data in the driver will not be reflected unless the power is turned off.)

Note2: "Selected Items Write": Writes the parameter values of the corresponding frame to the driver.
"Axis Writing": Writes all parameters to the driver.

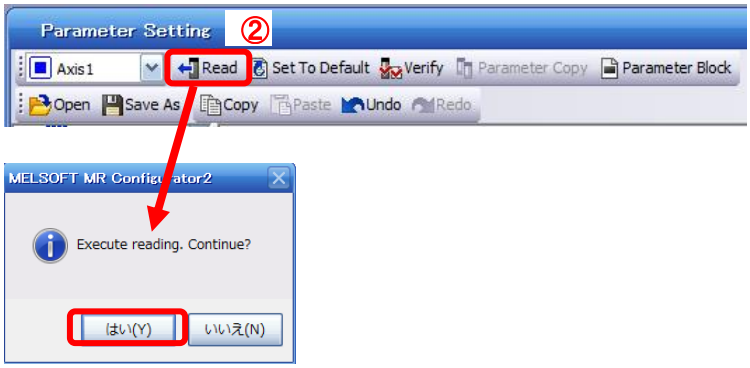
Note3: **Never change the "For manufacturer setting" parameter.**
If you change it by mistake, it may not work properly.

5.3.2 Reading parameters

The parameters in the driver by software, execute "Read".

(1) Click "Parameter" - "Parameter Setting" from “View” on the menu bar. The "Parameter Setting" window will be displayed.

(2) Click “Read”.



5.3.3 How to set parameters (Example: Operation mode change)

Set the parameters for each actuator.
Change the parameter value according to your company's usage.
For details of each parameter, refer to "LECSB2-T□ Operation Manual, Chapters 5,16.21 and 16.22 ".

"LECSB2-T□ Operation Manual Appendix 11 " for recommended parameter values for each actuator.

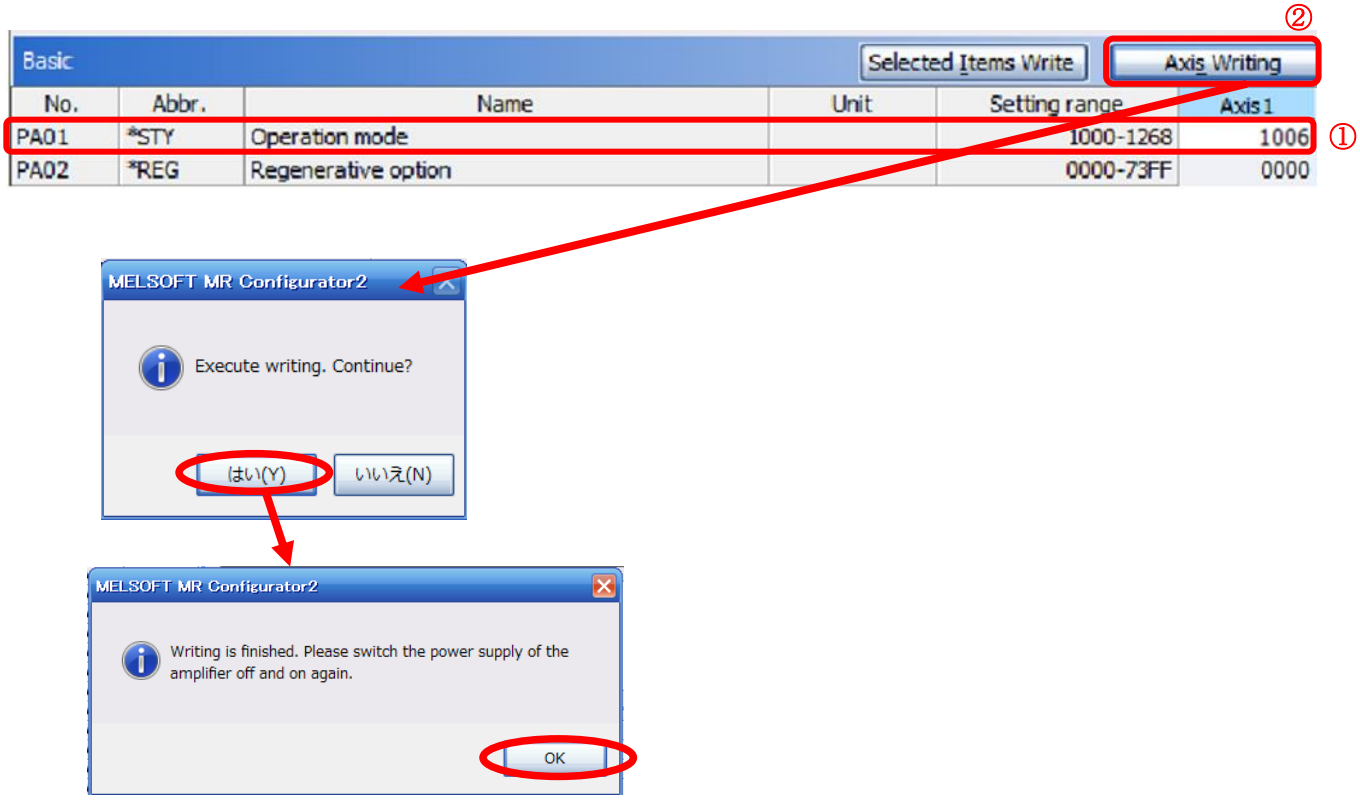
For position control mode (pulse input), do not change PT03/PT04/PT05/PT08/PT10/PT11 and do not change from the initial value.
(Set only for positioning mode (point table/program method).)

Setting example of control mode (PA01) (When setting to " **Position control mode (pulse input)** ")
(1) PA01 parameter to " 1000" on the "Basic settings" tab.

Setting example of control mode (PA01) (When setting to " **Positioning mode (point table)** ")
(1) PA01 parameter to 1006 in the Basic Settings tab.

Setting example of control mode (PA01) (When setting to " **positioning mode (programming method)** ")
(1) PA01 parameter to 1007 in the Basic Settings tab.

(2) Click “Axis Writing” button.
(3) Turn off the power and then turn it on again. parameters will be enabled.



Note the following points when changing each parameter.
Note1: Among the various parameters, there are some that are **"enabled by turning off the power once and then turning on again after setting"**. (The data in the driver will not be reflected unless the power is turned off.)
Note2: "Selected Items Write": Writes the parameter values of the corresponding frame to the driver.
“Axis Writing”: Writes all parameters to the driver.
Note3: **Never change the "For manufacturer setting" parameter.**
If you change it by mistake, it may not work properly.

5.3.4 Recommended Parameter Values by Actuator

"LECSB2-T□ Operation Manual Appendix 11 " for recommended parameter values for each actuator.

5.3.5 Absolute position detection system

* When using the absolute position detection system in the position control mode (pulse), an input/output unit is required in addition to the positioning unit.
  For details, refer to "LECSB2-T□ Operation Manual, Chapter 12 ".

When enabling the absolute position detection system

・Set parameter [PA03] to “0001” when using ABS transfer by DIO.

・Set parameter [PA03] to "0002" when using ABS transfer by communication.

(In positioning mode, ABS transfer by communication cannot be used. If parameter [PA03] is set to "0002", [AL37: Parameter error] will occur.)

Select the absolute position detection system.

Parameter			Initial value	Unit	Control mode			
No.	Symbol	Name			Position control	Internal speed	Internal torque	Positioning mode
PA03	*ABS	Absolute position detection system	0000h		○			○

Point
● After setting this parameter, turn off the power once and then turn it on again to enable it.

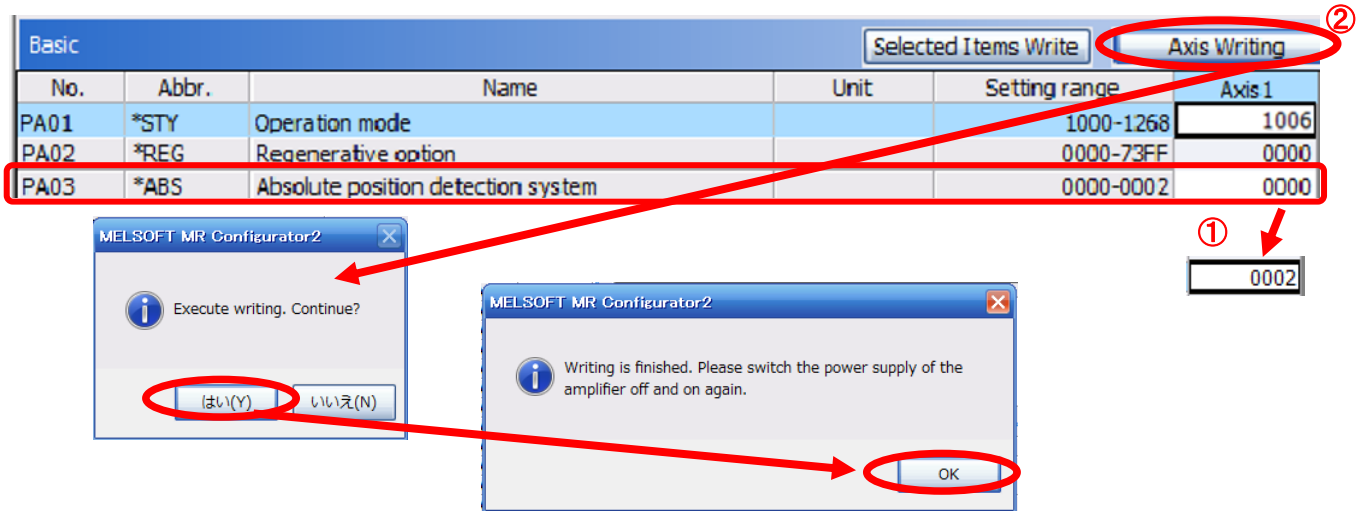
Set this parameter to enable the absolute position detection system.

[Pr. PA03]

			1

Absolute position detection system selection
0: Disabled (incremental system)
1: Enabled (absolute position detection system by DIO)
2: Enabled (absolute position detection system by communication-base
(available for the software version A3 or later)
(In the positioning mode, ABS transfer by communication can not be used.
When parameter [PA03] is set to "0002", [AL37: Parameter error] occurs.)

Example) When performing absolute position detection system using ABS transfer by communication.
[PA03] = 0002
(1) Set PA03 to 0002 in the Basic Settings tab.
(2) Click the "Axis Writing" button.
(3) <u>Turn off the power and then turn it on again. parameters will be enabled.</u>



5.3.6 Electronic Gears

It is necessary to set the electronic gear to convert the number of command pulses from the positioning unit (PLC) into the movement amount of the actuator.

Refer to "LECSB2-T□ Operation Manual Appendix 11 " for the recommended value of the electronic gear for each actuator.

[PA21] to "2001" when setting the electronic gear (PA06/PA07). *1

Parameter			Initial value	Setting value	Unit	Control mode			
No.	Symbol	Name				Position control	Internal speed	Internal torque	Positioning mode
PA21	*AOP3	Function selection A-3	0001h	**2001h**		○	○		○

Change the electronic gear value according to your usage.

(1) LECSB2-T setting parameters: Set [PA06] and [PA07].

Parameter			Initial value	unit	control mode			
No.	Symbol	Name			Position control	Internal speed	Internal torque	Positioning mode
PA06	CMX	Electronic gear numerator (Command pulse magnification numerator)	1		○			○
PA07	CDV	Electronic gear denominator (Command pulse magnification denominator)	1		○			○

Set as follows.

$$\frac{[PA06]}{[PA07]} = \frac{\text{Encoder Resolution} \times P}{\text{Actuator lead L [mm]} \times n1/n2 \times 1000 \times 16}$$

Encoder Resolution: 4194304 [pulses / rev]
P: Movement amount of actuator per 1 pulse command [μm] *2
n1/n2: Pulley ratio *3
1000: To convert the lead unit [mm] to [μm]
16: For compatibility with LECSB-S (encoder resolution 262144 pulses/rev) *1

Example)

In the case of as follows,
Actuator lead L: 6[mm]
Actuator movement amount P per 1 pulse command: 10[μm]
Pulley ratio n1/n2: 1/1

Set as follows.

$$\frac{[PA06]}{[PA07]} = \frac{4194304\times10}{6\times1/1\times1000\times16} = \frac{262144\times10}{6\times1000}$$

$$\frac{[PA06]}{[PA07]} = \frac{262144}{600}$$

[PA06] = 262144
[PA07] = 600

*1 "2001" in parameter [PA21] is a function that makes parameters [PA06] [PA07] compatible with LECSB2 -T encoder resolution 4194304 pulses/rev) and LECSB-S (encoder resolution 262144 pulses/rev).

*2 In the position control mode, calculate the "actuator movement distance P per 1 pulse command" at 10 [μm].
In the positioning mode, calculate the "actuator movement distance P per 1 pulse command" as 1 [μm].

*3 For the pulley ratio, refer to the lead section in "LECSB2-T □ Operation Manual Appendix 11 ".
For actuators with no pulley ratio listed, use "1/1" for calculation.

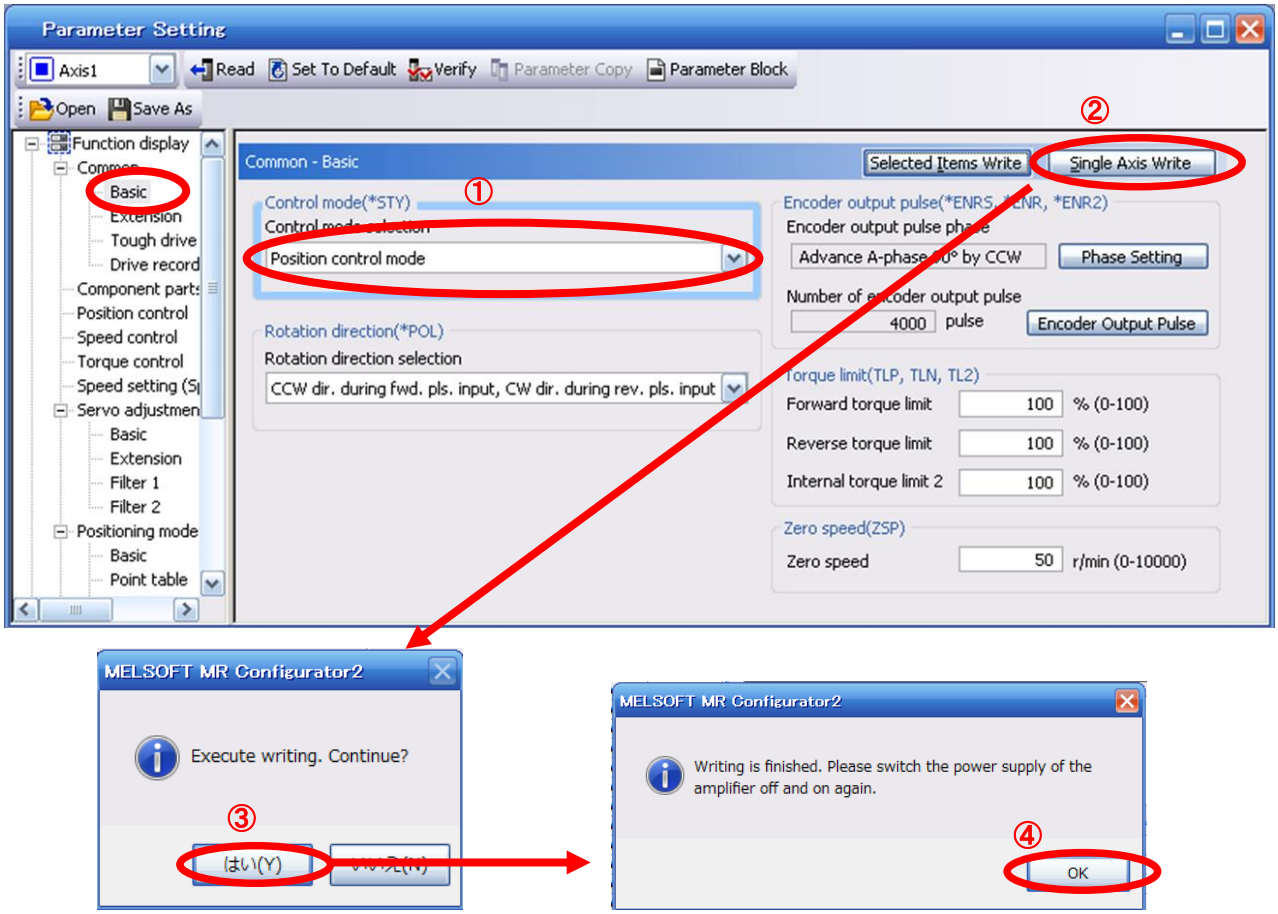
5.3.7 Control mode selection

(1) To use **position control mode (pulse input)**, navigate to the "Basic" tab of the "Parameter Setting" window - "Control mode selection" - Please select "Position control mode".
("PA01" parameter in the "Basic" tab of the List display also automatically changes to "1000".)

To use **positioning mode (point table)**, navigate to the "Basic" tab of the "Parameter Setting" window - "Control mode selection" - Please select "Positioning mode method".
("PA01" parameter in the "Basic" tab of the List display also automatically changes to "1006".)

To use **positioning mode (Program method)**, navigate to the "Basic" tab of the "Parameter Setting" window - "Control mode selection" - Please select "Positioning mode method".
("PA01" parameter in the "Basic" tab of the List display also automatically changes to "1007".)

(2) Click "Single Axis Write" button.
(3) Click "Yes (Y)" button.
(4) Click "OK" button. **(Turn off the power and then turn it on again. The parameters will be enabled.)**



5.3.8 Set the parameter of command pulse input form (position control mode (pulse input) only)

For position control mode (pulse input), set the command pulse input form from the host device (positioning unit).

- Input form (3 types)
  (1) Forward rotation pulse train / Reverse rotation pulse train
  (2) Pulse train / Sign
  (3) A-phase pulse train / B-phase pulse train

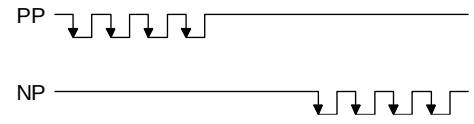
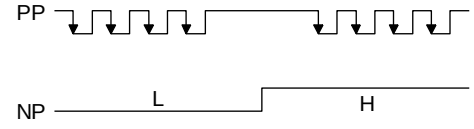
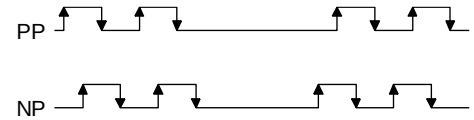
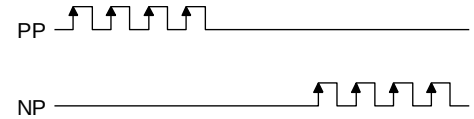
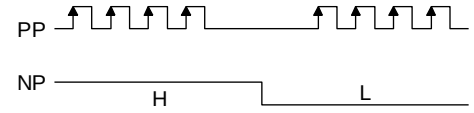
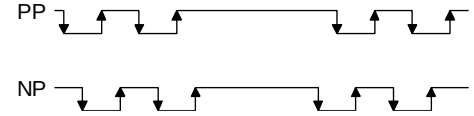
- Logic (2 types)
  (1) Positive logic (counts "rises")
  (2) Negative logic (counts "falling edges")

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

The host device (positioning unit) has a parameter for setting the "pulse output form (mode)". It is necessary to "match the form" between the host device (positioning unit) side and the LECSB2-T side.
If you don't match the form, it won't work properly. Note that the above "command pulse input form" may not be available depending on the host device (positioning unit).

No./Symbol/ Name	Setting digit	Function	Initial value [unit]	Control mode		
				P	S	T
PA13 *PLSS Command pulse input form	_ _ _ x	Command input pulse train form selection 0: Forward rotation / Reverse rotation pulse train 1: Signed pulse train 2: A-phase / B-phase pulse train (The driver multiplies the input pulse by 4 and captures it.)	0h	○		
	_ _ x _	Pulse train logic selection 0: Positive logic 1: Negative logic Match the logic of the command pulse train received from the connected host.	0h	○		
	_ x _ _	Command input pulse train filter selection Noise resistance can be improved by selecting a filter that matches the command pulse frequency. 0: When the command input pulse train is 4 Mpulses /s or less 1: When the command input pulse train is 1 Mpulse /s or less 2: When the command input pulse train is 500 kpulses /s or less 3: When the command input pulse train is 200 kpulses /s or less (supported from software version A5 or later) "1" corresponds to commands up to 1 Mpulse /s. Set "0" when inputting a command exceeding 1 Mpulse /s and 4 Mpulses /s or less. Incorrect setting may cause the following malfunctions. - Setting a higher value than the actual command will reduce the noise resistance. - Setting a lower value than the actual command, the position deviation will occur.	1h	○		
	x _ _ _	For manufacturer setting	0h			

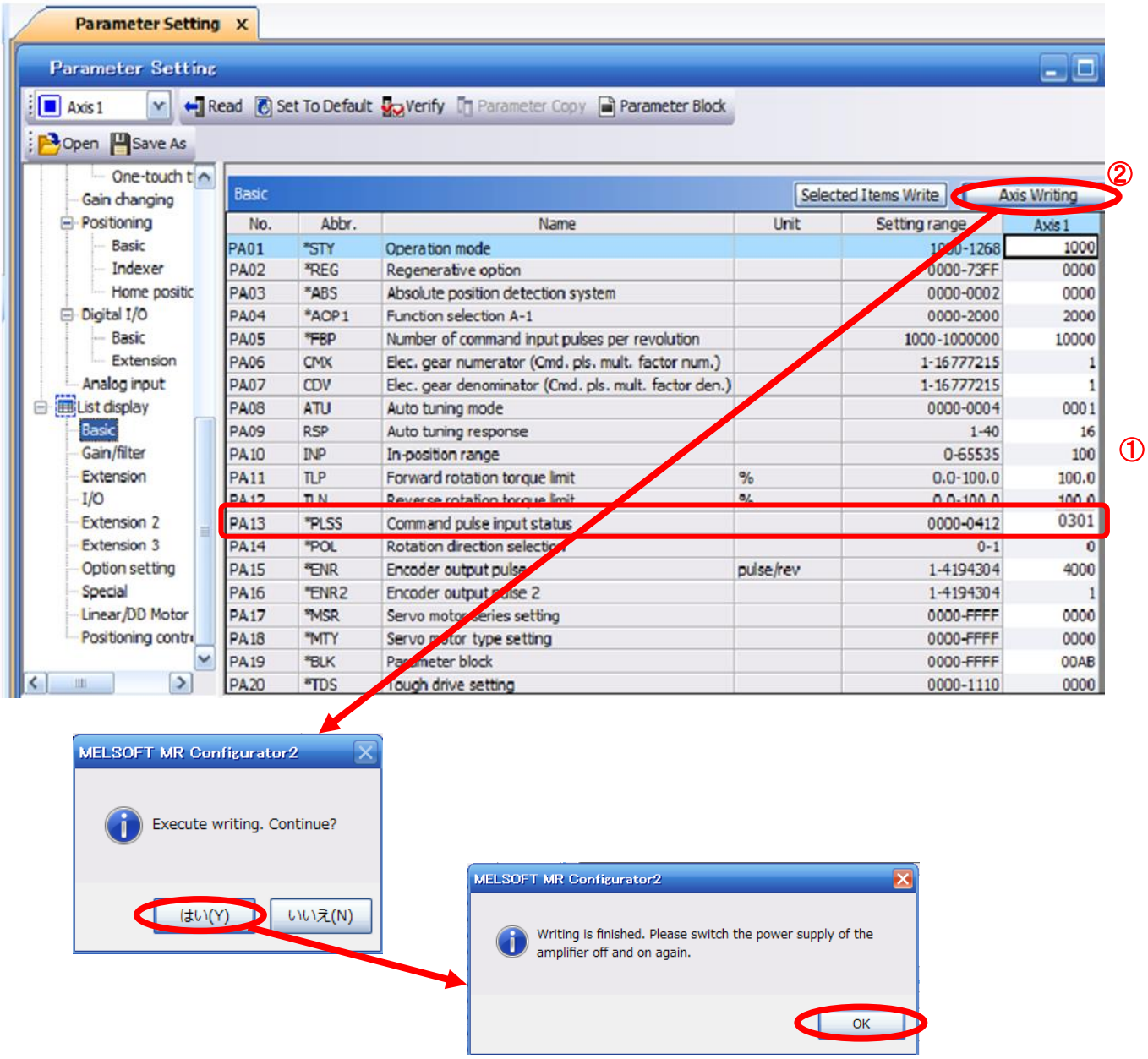
Command input pulse train form selection

Setting value	Pulse train form		Forward rotation (positive direction) command / Reverse rotation (negative direction) command
_ _ 1 0	Negative logic	Forward rotation pulse train (Positive direction pulse train) Reverse rotation pulse train (Negative direction pulse train)	
_ _ 1 1		Pulse train + sign	
_ _ 1 2		A -phase pulse train B -phase pulse train	
_ _ 0 0	Positive logic	Forward rotation pulse train (Positive direction pulse train) Reverse rotation pulse train (Negative direction pulse train)	
_ _ 0 1		Pulse train + sign	
_ _ 0 2		A -phase pulse train B -phase pulse train	

The arrows in the table indicate the timing of capturing the pulse.
A -phase and B -phase pulse trains are read after being multiplied by 4.

Example: Command with a command pulse frequency of 200 kpps or less
When the pulse input form is set to "pulse train + sign" with positive logic
"PA13" = 0301

(1) Change "PA13 " to " 0301 " in the "Basic (List display)" tab.
(2) Click the "Axis Writing" button.
(3) **Turn off the power and then turn it on again. The parameters will be enabled.**



5.3.9 Verify of parameters

To compare the "parameters" set in the setup software with the "Parameters set in the driver" / "Initial value parameters" / "Saved parameters", perform “Verify”.

(1) Click the “Verify” button on the “Parameter Setting” window to display the “Verification Setting” window.

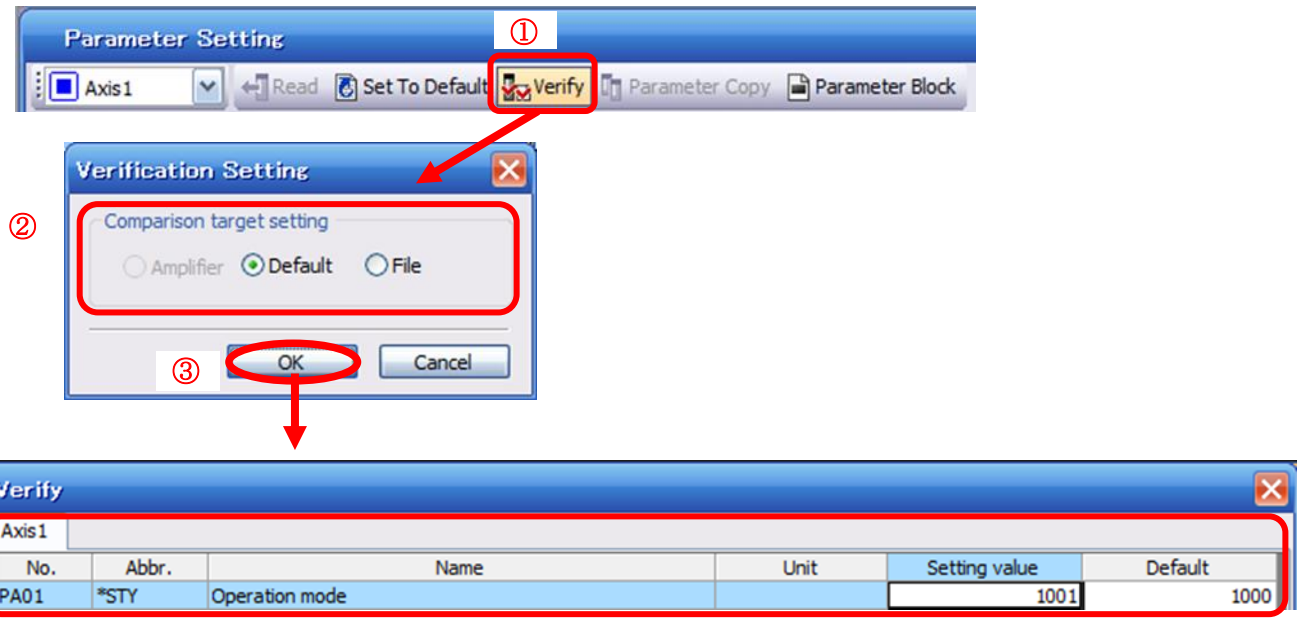
(2) Select the comparison target.

Amplifier: Compare with the parameters set in the driver.

Default: Compare with the initial value of the parameter.

File: Compare with saved parameters.

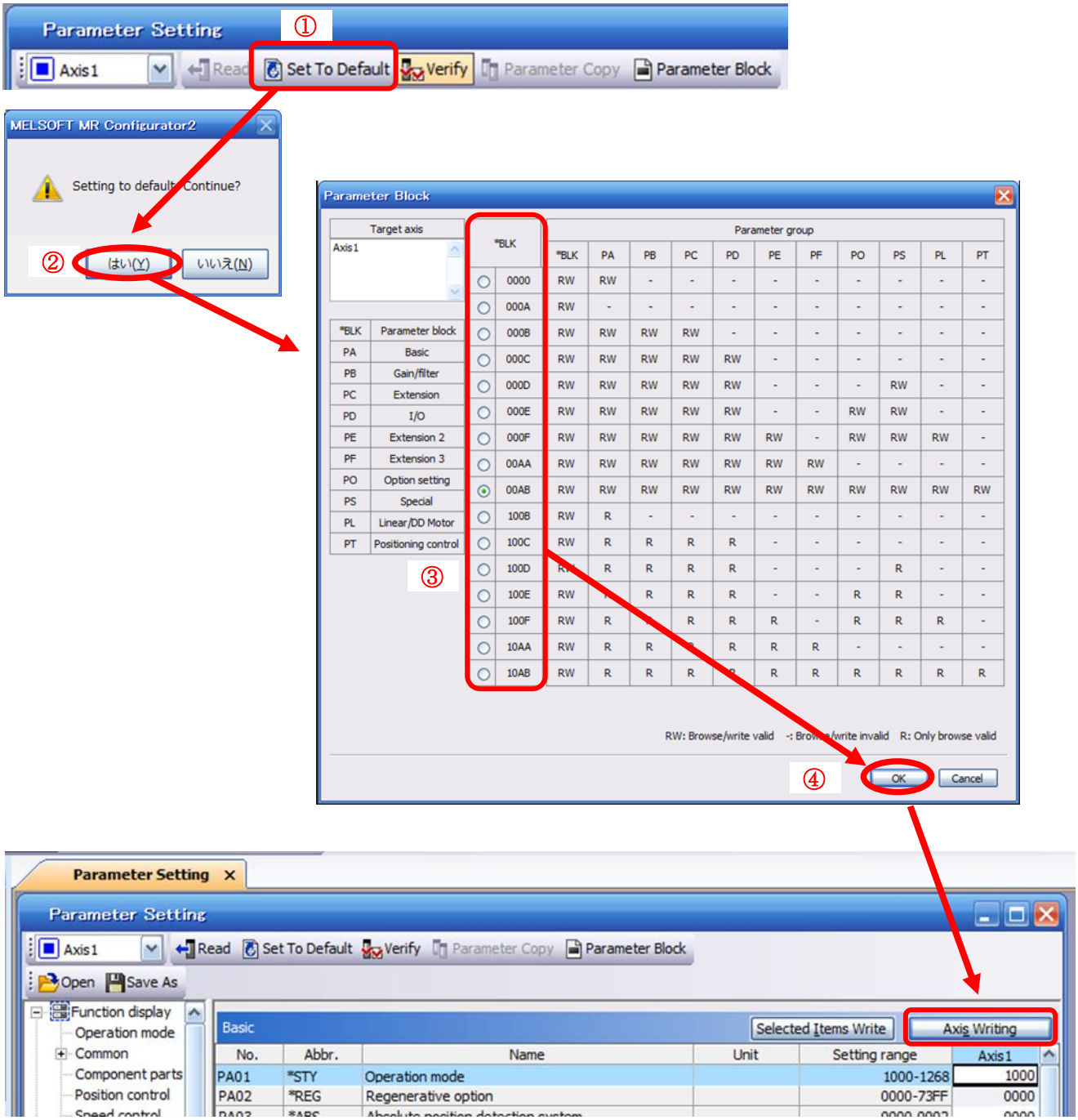
(3) Click the "OK" button. Verification results will be displayed.



5.3.10 Parameter initialization

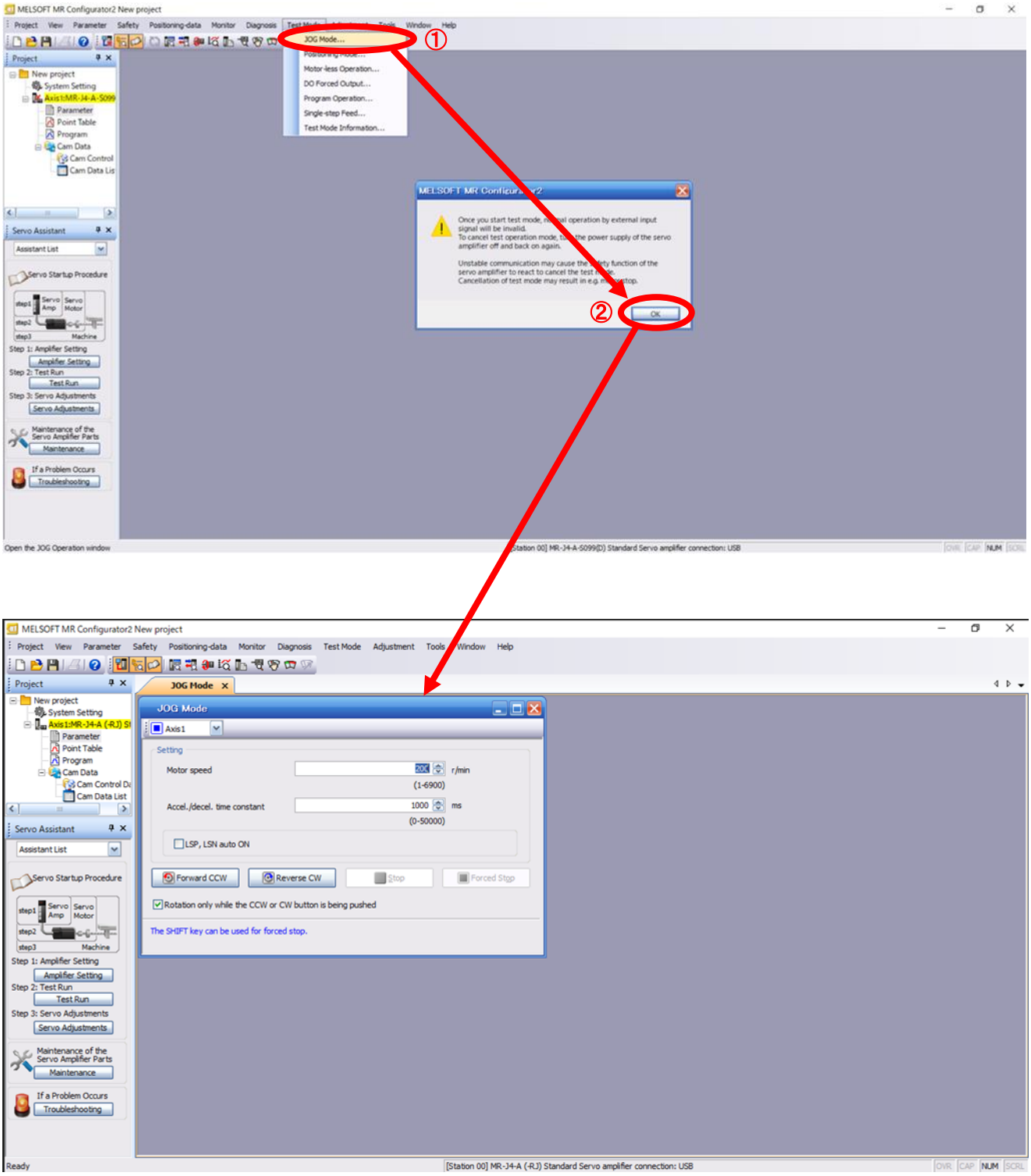
To initialize the parameters in the driver, perform "Set to Default".
Initializing a parameter is irreversible. Be sure to save the parameters in use.
(Refer to "LECSB2-T☐ Operation Manual (Simplified Edition), Chapter 5.8.1" for how to save parameters.)

(1) On the “Parameter Setting” window, click the "Set to Default" button.
(2) Click the "Yes (Y)" button. The “Parameter Block” window will be displayed.
(3) On the “Parameter Block” window, select the parameter block to initialize.
(4) Click the "OK" button.
Makes the referable range of the selected parameter block an editable parameter and sets the initial value.
(5) Click the " Axis Writing " button on each parameter setting window.
(6) **Turn off the power and then turn it on again. The parameters will be enabled.**



5.4 JOG operation by setup software

(1) Click "Test Mode" - "JOG Mode" in the setup software to display the "JOG Mode" window.
(2) Click "OK".
(When using this function, external input signal operation will be disabled. When controlling from a PLC or host device, be sure to turn the power OFF and then ON again before using.)

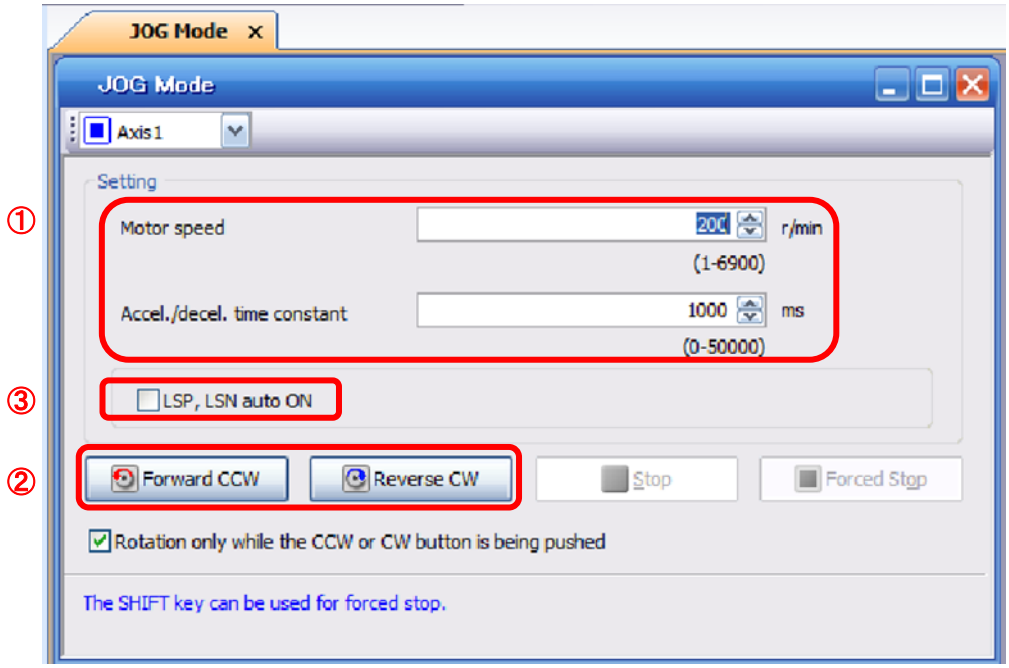


5.4.1 JOG operation

(1) Check the actuator at low speed to avoid accidental collision with the end of the stroke.
Refer to "LECSB2-T□ Operation Manual (Simplified Edition), section 5.6.2" for setting the motor speed.
For setting the acceleration/deceleration time constant, refer to "LECSB2-T□ Operation Manual (Simplified Edition), section 5.6.3".

(2) “Forward CCW” and “Reverse CW” perform JOG operation of the actuator.
(If it does not work , check the wiring and parameters.)
When using the setup software to perform JOG operation, changing the setting of parameter "PA14 (rotation direction selection)" does not change the movement direction of the actuator (motor rotation direction).
The actuator moves in the direction of the "Forward CCW" button or "Reverse CW" button.

(3) If the "Stroke end" (LSP, LSN) signals are not set to turn on automatically, an alarm will occur.
(If checked, the "stroke end" (LSP, LSN) signal will automatically turn ON only when this window is open.)



Item	Setting range	Unit	Content
Motor speed	0 ~ allowable speed of each actuator	r/min	Set the command rotation speed (**motor rotation speed per minute**) when positioning is executed.
Acceleration/ Deceleration Time constant	0 ~ 50000	ms	Set **the time to reach/stop the rated speed (3000 r/min).**

5.5 How to change the allocation of I/O signals

Input/output signal assignment can be changed as appropriate from initial settings.
When operating the actuator, it may be necessary to change the allocation of I/O signals.
Please allocate according to your system specifications.
Please note that the signal that is included in the initial setting will be changed when setting.
* To set [PD**], set the parameter write protection [PA19] so that PD** can be edited.

For details, refer to "LECSB2-T □ Operation Manual, Chapter 5".

- PD03 ~ PD14, PD17 ~ PD22, PD43 ~ PD46
Input signal assignment
(CN1-15 ~ CN1-19, CN1-41, CN1-43 ~ CN1-45, CN1-10 / CN1-37, CN1-35 / CN1-38)

- PD23 ~ PD26, PD28, PD47
Output signal assignment
(CN1-22 ~ CN1-25, CN1-49, CN1-13/CN1-14)

5.5.1 Set input signal automatic ON selection parameter

Set the input signal automatic ON selection parameter.
By changing the settings of "PD01: Input signal automatic ON selection 1", "PD41: Input signal automatic ON selection 3", and "PD42: Input signal automatic ON selection 4", the input signal is automatically turned on when the control circuit power supply turned on.
For signals that can be turned on automatically, it is possible to expand the options for input/output signals by turning on automatically. Please allocate according to your system specifications.

Perform automatic ON selection with parameters [PD01], [PD41], and [PD42], or wire the I/O signals.
When wiring I/O signal, do not set the corresponding signal in "PD01:Input signal automatic ON selection 1", "PD41:Input signal automatic ON selection 3", "PD42:Input signal automatic ON selection 4".

(Example) If the servo-on (SON) is set to be 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, servo-on/servo-off commands cannot be issued from I/O signals.

Note) When using all I/O signals, set parameters [PD01], [PD41], and [PD42] to “0000”.

Set "PD01: Input signal automatic ON selection 1", "PD41: Input signal automatic ON selection 3", and "PD42: Input signal automatic ON selection 4" in hexadecimal (HEX).

5.5.2 Signals required for operation within the input signal automatic ON selectable range

(1) Other than positioning mode

(a) PD01: Input signal automatic ON selection 1

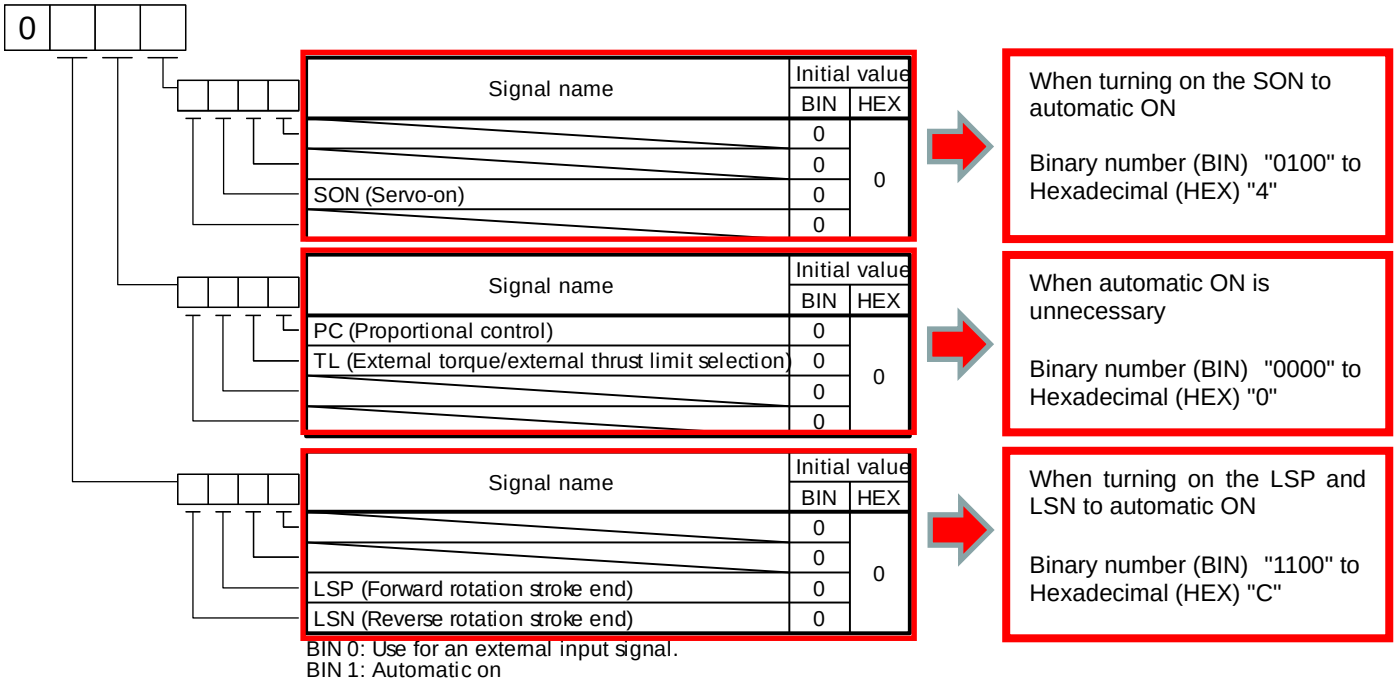
SON, LSP, and LSN to turn ON automatically, set "PD01 " to "0C04".

PD01	SON	Servo ON	**OFF: Servo OFF** **ON: Servo ON (operable)**
	LSP	Forward rotation stroke end (B contact)	**OFF: Forward rotation stroke end** **ON: Forward rotation stroke end release (operable)**
	LSN	Reverse rotation stroke end (B contact)	**OFF: Reverse rotation stroke end** **ON: Reverse rotation stroke end release (operable)**

other than positioning mode, EM2 (Forced stop 2) cannot be forcibly set to automatic ON on the parameter.

EM2 (Forced stop 2) should be turned ON with I /O wiring: EM2 (Forced stop 2) canceled (operation possible).

PD01 : Input signal automatic ON selection 1



BIN 0: Use for an external input signal.
BIN 1: Automatic on

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

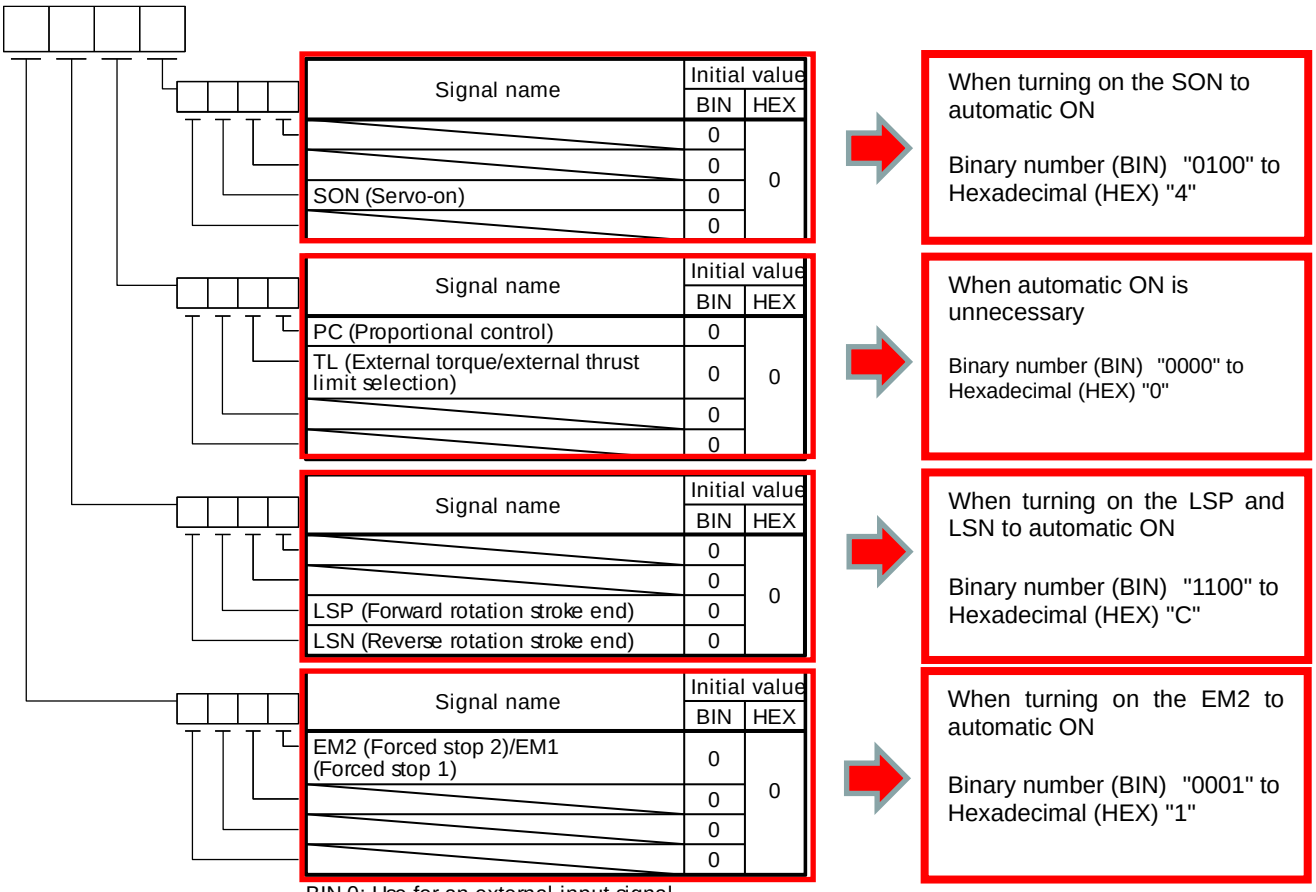
(2) Positioning mode

(a) PD01: Input signal automatic ON selection 1

SON, LSP, LSN, and EM2 to turn ON automatically, set "PD01" to "1C04".

PD01	SON	Servo ON	**OFF: Servo OFF** **ON: Servo ON (operable)**
	LSP	Forward rotation stroke end (B contact)	**OFF: Forward rotation stroke end** **ON: Forward rotation stroke end release (operable)**
	LSN	Reverse rotation stroke end (B contact)	**OFF: Reverse stroke end** **ON: Reverse rotation stroke end release (operable)**
	EM2	Forced stop 2 (B contact)	**OFF: Forced stop** **ON: Forced stop canceled (operable)**

PD01 : Input signal automatic ON selection 1



BIN 0: Use for an external input signal.
BIN 1: Automatic on

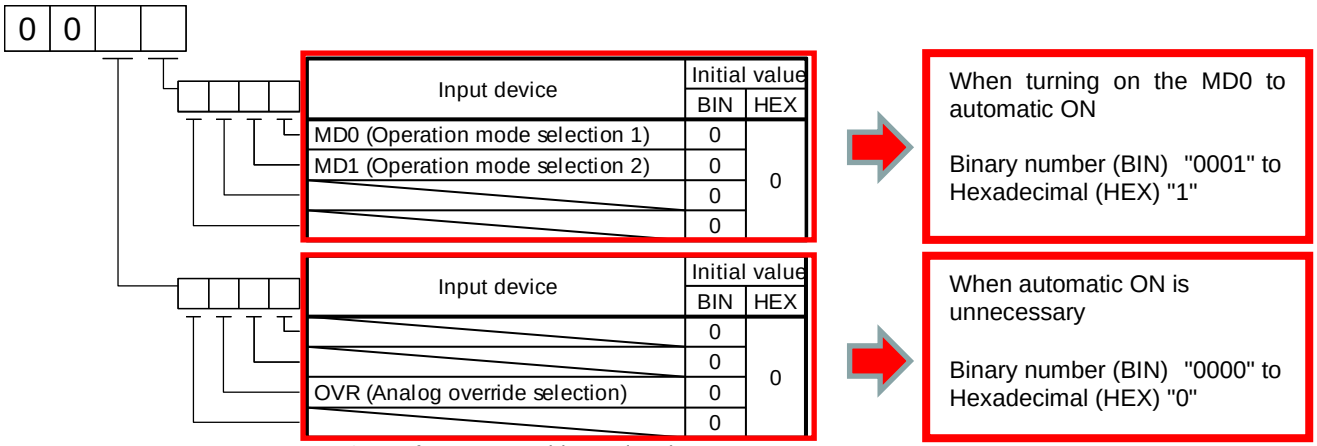
Binary number -> Decimal / Hexadecimal

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

(b) PD41: Input signal automatic ON selection 3
MD0 to turn ON automatically, set "PD41" to "0001".

PD41	MD0	Operation mode selection 1	**OFF: Manual operation mode** → JOG operation available. **ON: Automatic operation mode** → Home position return/positioning mode operation available.

PD 41 : Input signal automatic ON selection 3



BIN 0: Use for an external input signal.
BIN 1: Automatic on

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

*** When enabling "Servo ON" (SON), "Stroke end" (LSP, LSN), and "Forced stop 2" (EM2) signals**

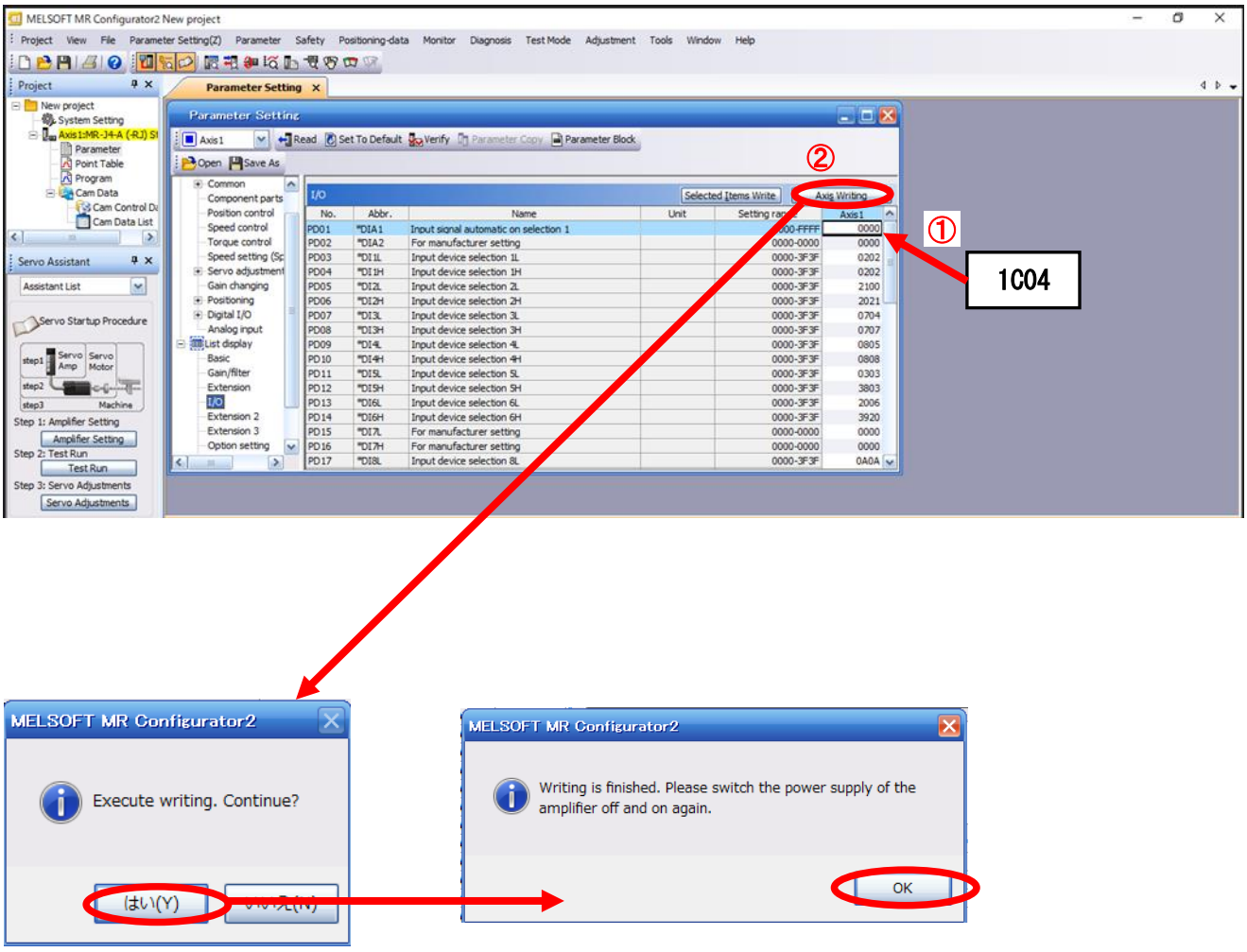
(1) "PD01" to "1C04" in the "I/O" tab of the List display.
* Input signal automatic ON selection can also be performed from the "Basic" tab of the Digital I/O. For details, refer to "LECSB2-T□ Operation Manual (Simplified Edition), Chapter 5.5.8 (1)".

(2) Click the "Axis Writing" button.

(3) **Turn off the power and then turn it on again. The parameters will be enabled**

* This setting will automatically turn ON for the **" Servo ON " (SON), "Stroke end" (LSP, LSN), and "Forced stop 2" (EM2)** signals when the power is turned ON.

* **EM2 (Forced stop 2) cannot be forcibly set to automatic ON in parameters other than positioning mode. EM2 (Forced stop 2) should be turned ON by I/O wiring: EM2 (Forced stop 2) canceled (operable).**



5.5.3 Initial allocation of I/O signals

(1) Position control mode (Pulse input)

The initial allocation of I/O signals is as follows.

- PD03 ~ PD14, PD17 ~ PD22
Input signal assignment
(CN1-15 ~ CN1-19, CN1-41, CN1-43 ~ CN1-45)

- PD23 ~ PD26, PD28, PD47
Output signal assignment
(CN1-22 ~ CN1-25, CN1-49, CN1-13/CN1-14)

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	0202
(Non)	-	CN1-16	DI-1	PD05	2100
Proportion control	PC	CN1-17	DI-1	PD07	0704
External torque limit selection	TL	CN1-18	DI-1	PD09	0805
Reset	RES	CN1-19	DI-1	PD11	0303
Clear	CR	CN1-41	DI-1	PD13	2006
Forced stop 2	EM2	CN1-42	DI-1	(Non)	-
Forward rotation stroke end	LSP	CN1-43	DI-1	PD17	0A0A
Reverse rotation stroke end	LSN	CN1-44	DI-1	PD19	0B0B
Control switching	LOP	CN1-45	DI-1	PD21	2323

Output signal points (8) (Position control mode) and initial assignment

Device	Symbol	Connector Pin No	I/O division	Parameters No.	Initial value
(Non)	-	CN1-13	DO-1	PD47	0000
(Non)	-	CN1-14	DO-1	PD47	0000
In-position	INP	CN1-22	DO-1	PD23	0004
Zero speed delection	ZSP	CN1-23	DO-1	PD24	000C
In-position	INP	CN1-24	DO-1	PD25	0004
Limiting torque	TLC	CN1-25	DO-1	PD26	0007
Malfunction	ALM	CN1-48	DO-1	(Non)	-
Ready	RD	CN1-49	DO-1	PD28	0002

For details of signals, refer to "LECSB2-T □ Operation Manual, Sections 3.5 and 3.6".
For details of parameter settings, refer to "LECSB2-T □ Operation Manual, section 5.2 ".

* CN1-10/CN1-37 and CN1-35/CN1-38 are terminals for pulse input. It cannot be assigned as an input signal.
* Input signals (CN1-15 pin ~ CN1-19 pin, CN1-41 pin, CN1-43 pin ~ CN1-45 pin) and output signals (CN1-13 pin ~ CN1-14 pin, CN1-22 pin ~ CN1-25 pin, CN1-48 pin ~ CN1-49 pin) can be assigned wiring and I/O signals with sink (NPN) interface and source (PNP) interface.

*When using the absolute position detection system in position control (pulse input) mode, the output signal CN1-22 pin is used as transmit data bits during ABS transfer mode.

(2) Positioning mode (Point table)

The initial allocation of I/O signals is as follows.

- PD03 ~ PD14, PD17 ~ PD22, PD43 ~ PD46
Input signal assignment
(CN1-15 ~ CN1-19, CN1-41, CN1-43 ~ CN1-45, CN1-10/CN1-37, CN1-35/CN1-38)

- PD23 ~ PD26, PD28, PD47
Output signal assignment
(CN1-22 ~ CN1-25, CN1-49, CN1-13/CN1-14)

Input signal points (12): (Positioning mode) and initial assignment

Device	Symbol	Connector Pin No	I/O division	Parameters No.	Initial value
Point table no./program No. selection 3	DI2	CN1-10 / CN1-37	DI-1	PD44	3A00
Servo-on	SON	CN1-15	DI-1	PD04	0202
Operation mode selection 1	MD0	CN1-16	DI-1	PD06	2021
Forward rotation start	ST1	CN1-17	DI-1	PD08	0707
Reverse rotation start	ST2	CN1-18	DI-1	PD10	0808
Point table no./program No. selection 1	DI0	CN1-19	DI-1	PD12	3803
Point table no./program No. selection 4	DI3	CN1-35 / CN1-38	DI-1	PD46	3B00
Point table no./program No. selection 2	DI2	CN1-41	DI-1	PD14	3920
Forced stop 2	EM2	CN1-42	DI-1	(Non)	-
Forward rotation stroke end	LSP	CN1-43	DI-1	PD18	0A00
Reverse rotation stroke end	LSN	CN1-44	DI-1	PD20	0B00
Proximity dog	DOG	CN1-45	DI-1	PD22	2B23

Output signal points (8): (positioning mode) and initial assignment

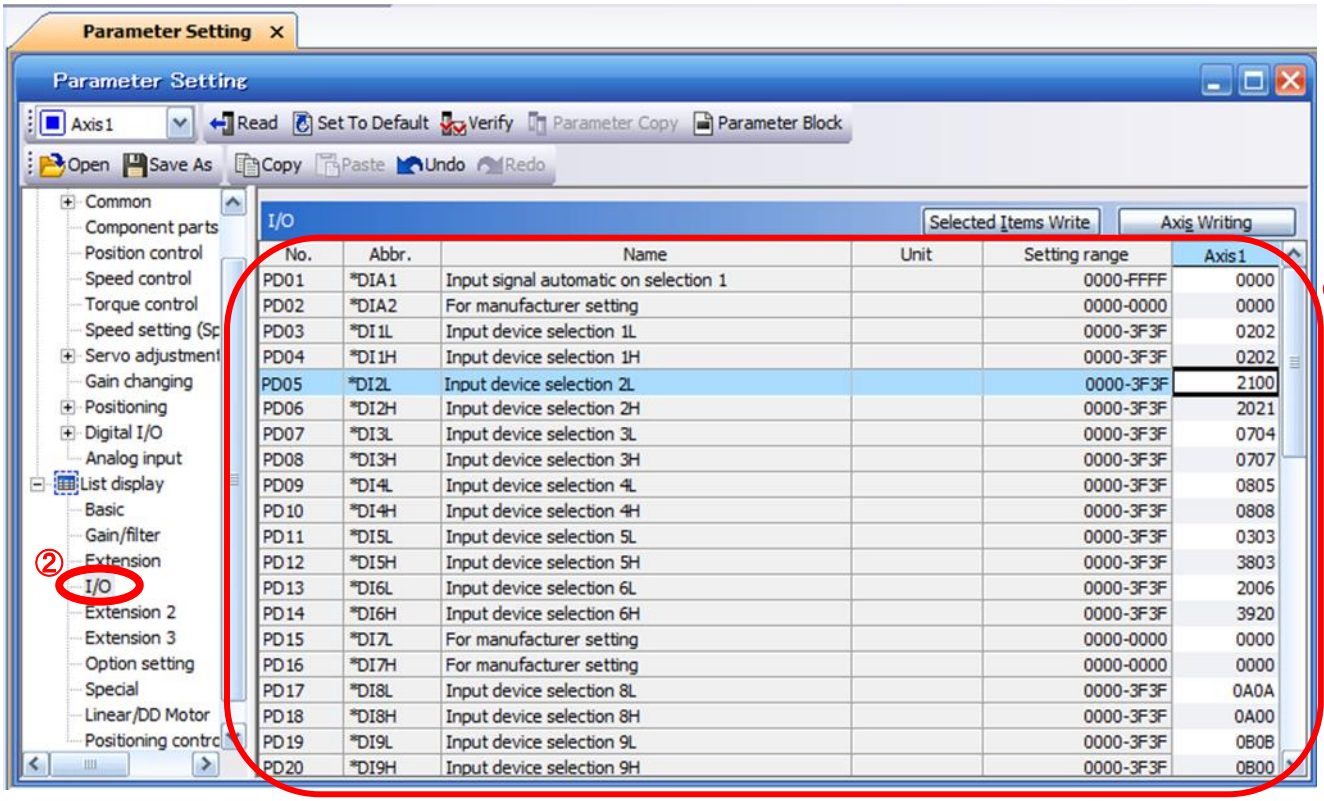
Device	Symbol	Connector Pin No	I/O division	Parameters No.	Initial value
(Non)	-	CN1-13	DO-1	PD47	0000
(Non)	-	CN1-14	DO-1	PD47	0000
In-position	INP	CN1-22	DO-1	PD23	0004
Zero speed delection	ZSP	CN1-23	DO-1	PD24	000C
In-position	INP	CN1-24	DO-1	PD25	0004
Limiting torque	TLC	CN1-25	DO-1	PD26	0007
Malfunction	ALM	CN1-48	DO-1	(Non)	-
Ready	RD	CN1-49	DO-1	PD28	0002

For details of signals, LECSB2 -T Operation Manual, Chapter 16.2".
For details of parameter settings, refer to "LECSB2-T Operation Manual, section 16.22".

* CN1-10 pin and CN1-35 pin can be assigned wiring and input signals only for the sink (NPN) interface.
* CN1-37 pin and CN1-38 pin can be assigned wiring and input signals only for the source (PNP) interface.
* Input signals (CN1-15 pin ~ CN1-19 pin, CN1-41 pin, CN1-43 pin ~ CN1-45 pin) and output signals (CN1-13 pin ~ CN1-14 pin, CN1-22 pin ~ CN1-25 pin, CN1-48 pin ~ CN1-49 pin) can be assigned wiring and I/O signals with sink (NPN) interface and source (PNP) interface.

5.5.4 Signal Allocation using Setup Software

(1) Click "Parameter" - "Parameter Setting" in the setup software to display the "Parameter Setting" window.
(2) Click the "I/O" tab in the List display.
* Allocation of I/O signals can also be performed from the "Basic" tab of the Digital I/O.
For details, refer to "LECSB2-T□ Operation Manual (Simplified Edition)", section 5.5.8 (2).
(3) When changing the allocation of each signal, it is possible to change with each parameter of "PD03" ~ "PD14", "PD17" ~ "PD26", "PD28", "PD43" ~ "PD47".



5.5.5 Allocation Examples for Position Control Mode (Pulse Input)

(1) Example of Internal torque limit selection (TL1) Setting

When changing CN1-16 pin " Non " to "Internal torque limit selection" (TL1)

Device	Symbol	Connector Pin No	I/O division	Parameters No.	Initial value
Servo-on	SON	CN1-15	DI-1	PD03	0202
① (Non)	-	CN1-16	DI-1	PD05	2100
Proportion control	PC	CN1-17	DI-1	PD07	0704
External torque limit selection	TL	CN1-18	DI-1	PD09	0805
Reset	RES	CN1-19	DI-1	PD11	0303
Clear	CR	CN1-41	DI-1	PD13	2006
Forced stop 2	EM2	CN1-42	DI-1	(Non)	-
Forward rotation stroke end	LSP	CN1-43	DI-1	PD17	0A0A
Reverse rotation stroke end	LSN	CN1-44	DI-1	PD19	0B0B
Control switching	LOP	CN1-45	DI-1	PD21	2323

Device	Symbol	Connector Pin No	I/O division	Parameters No.	Initial value
Servo-on	SON	CN1-15	DI-1	PD03	0202
Internal torque limit selection	TL1	CN1-16	DI-1	PD05	2100→ 2109
Proportion control	PC	CN1-17	DI-1	PD07	0704
External torque limit selection	TL	CN1-18	DI-1	PD09	0805
Reset	RES	CN1-19	DI-1	PD11	0303
Clear	CR	CN1-41	DI-1	PD13	2006
Forced stop 2	EM2	CN1-42	DI-1	(Non)	-
Forward rotation stroke end	LSP	CN1-43	DI-1	PD17	0A0A
Reverse rotation stroke end	LSN	CN1-44	DI-1	PD19	0B0B
Control switching	LOP	CN1-45	DI-1	PD21	2323

(1) Set "PD05" from "2100" to "21**09**".

PD05 * DI2L Input device selection 2L	Any input device can be assigned to CN1-16 pin.		
	_ _ x x	Position control mode Device selection	09h
	x x _ _	Speed control mode Device selection	__

set value	Input device (Note 1)		
	P.	S.	T.
02	SON	SON	SON
03	RES	RES	RES
04	computer	computer	
05	TL	TL	
06	CR		
07		ST1	RS2
08		ST2	RS1
09	TL1	TL1	
0A	LSPs	LSPs	LSPs
0B	LSNs	LSNs	LSNs
0D	CDPs	CDPs	
0E	CLDMore		
0F	MECR		
20		SP1	SP1
21		SP2	SP2
22		SP3	SP3
23	LOPs	LOPs	LOPs
24	CM1		
25	CM2		
26		STAB2	STAB2

Note1) P: Position control mode S: Speed control mode T: Torque control mode

(2) Example of signal assignment by setup software

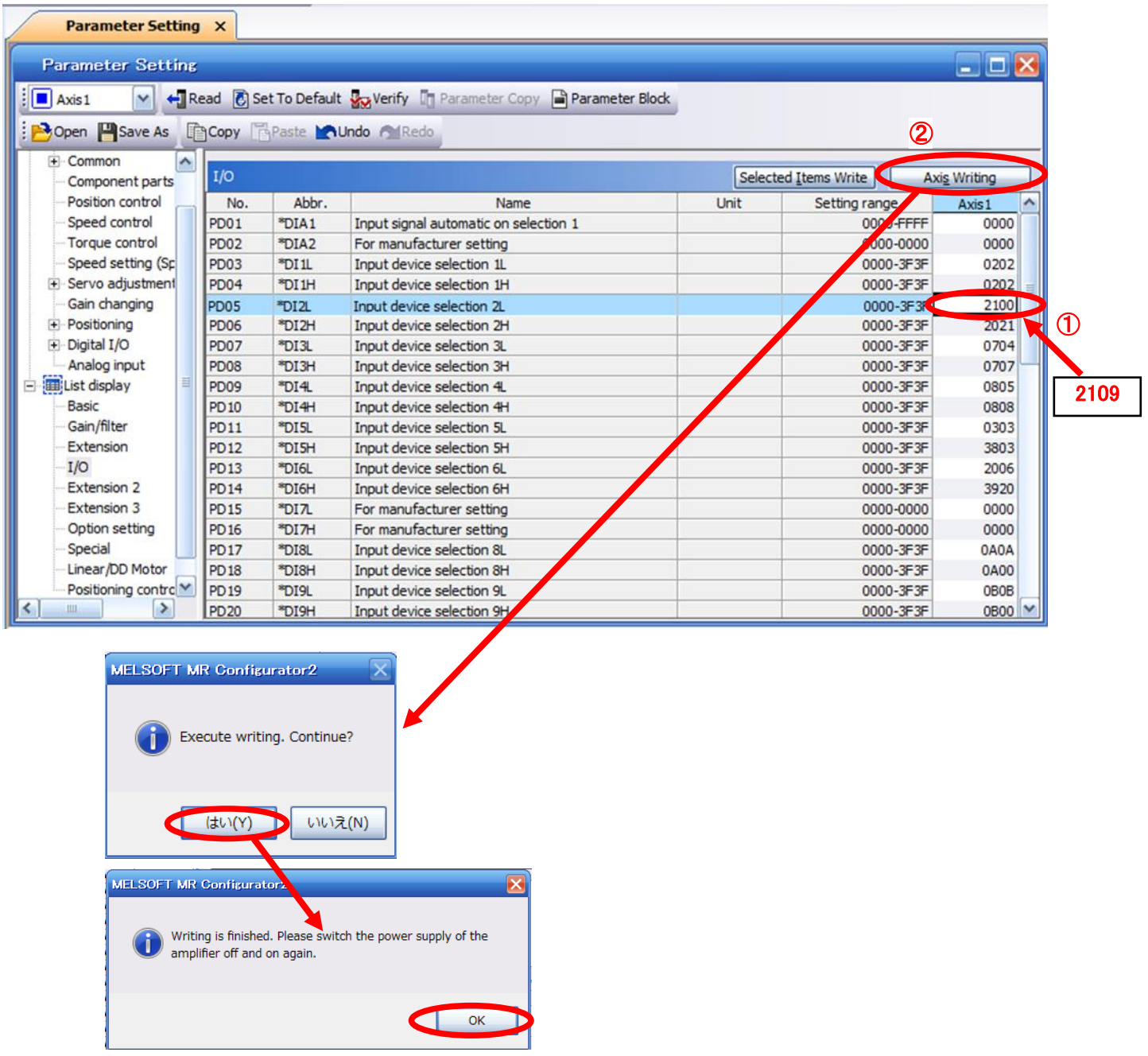
When changing CN1-16 pin from " Non " to "internal torque limit selection" (TL1)

(1) “PD05 " from " 2100 " to " 2109 " on the " I/O" tab in the List display.

* Allocation of I/O signals can also be performed from the "Basic" tab of the Digital I/O. For details, refer to "LECSB2-T□ Operation Manual (Simplified Edition)", section 5.5.8 (2).

(2) Click the "Axis Writing" button.

(3) **Turn off the power and then turn it on again. The parameters will be enabled**



* Wire the CN1-16 pins separately.

* the parameter setting values when assigning input signals to pins CN1-15 ~ CN1-19, CN1-41, CN1-43 ~ CN1-45, refer to "LECSB2 -T Operation Manual, section 5.2.4" (PD03 ~ PD14, PD17 ~ PD22).

* the parameter settings values when assigning output signals to pins CN1- 22 ~ CN1-25, CN1- 49, CN1-13 /CN1-14, refer to "LECSB2 -T Operation Manual, section 5.2.4" (PD23 ~ PD26, PD28, PD47).

5.5.6 Setting example when changing the number of point tables in positioning (point table)

A maximum of 255 points can be set for the point table using input signals DI0 ~ DI7.

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode CP	Control mode CL	Control mode PS
Point table No./program No. selection 1	DI0	CN1-19	Point table method Select point tables and home position return mode with DI0 to DI7.	DI-1	○	○	
Point table No./program No. selection 2	DI1	CN1-41			○	○	
Point table No./program No. selection 3	DI2	CN1-10			○	○	
Point table No./program No. selection 4	DI3	CN1-35			○	○	
Point table No./program No. selection 5	DI4				△	△	
Point table No./program No. selection 6	DI5				△	△	
Point table No./program No. selection 7	DI6				△	△	
Point table No./program No. selection 8	DI7				△	△	

Device (Note)

DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0	Selection contents
0	0	0	0	0	0	0	0	Home position return mode
0	0	0	0	0	0	0	1	Point table No. 1
0	0	0	0	0	0	1	0	Point table No. 2
0	0	0	0	0	0	1	1	Point table No. 3
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・
1	1	1	1	1	1	1	0	Point table No. 254
1	1	1	1	1	1	1	1	Point table No. 255

Note. 0: Off
1: On

Initially, only four signals are assigned to DI0 (CN1-19), DI1 (CN1-41), DI2 (CN1-10), and DI3 (CN1-35).

A table of 256 points can be specified, but only 255 points of the point table can be specified because one of them is used for home position return.
When using a maximum of 255 point tables, it is necessary to allocate wiring and input signals for DI4 to DI7.

(1) When changing CN1-18 pins "Reverse rotation start" (ST2) to "Point table no./program No. selection 5" (DI4)

Device	Symbol	Connector Pin No	I/O division	Parameters No.	Initial value
Point table no./program No. selection 3	DI2	CN1-10 / CN1-37	DI-1	PD44	3A00
Servo-on	SON	CN1-15	DI-1	PD04	0202
Operation mode selection 1	MD0	CN1-16	DI-1	PD06	2021
Forward rotation start	ST1	CN1-17	DI-1	PD08	0707
Reverse rotation start	ST2	CN1-18	DI-1	PD10	0808
Point table no./program No. selection 1	DI0	CN1-19	DI-1	PD12	3803
Point table no./program No. selection 4	DI3	CN1-35 / CN1-38	DI-1	PD46	3B00
Point table no./program No. selection 2	DI2	CN1-41	DI-1	PD14	3920
Forced stop 2	EM2	CN1-42	DI-1	(Non)	-
Forward rotation stroke end	LSP	CN1-43	DI-1	PD18	0A00
Reverse rotation stroke end	LSN	CN1-44	DI-1	PD20	0B00
Proximity dog	DOG	CN1-45	DI-1	PD22	2B23

①

Device	Symbol	Connector Pin No	I/O division	Parameters No.	Initial value
Point table no./program No. selection 3	DI2	CN1-10 / CN1-37	DI-1	PD44	3A00
Servo-on	SON	CN1-15	DI-1	PD04	0202
Operation mode selection 1	MD0	CN1-16	DI-1	PD06	2021
Forward rotation start	ST1	CN1-17	DI-1	PD08	0707
Point table no./program No. selection 5	DI4	CN1-18	DI-1	PD10	0808→ 3C08
Point table no./program No. selection 1	DI0	CN1-19	DI-1	PD12	3803
Point table no./program No. selection 4	DI3	CN1-35 / CN1-38	DI-1	PD46	3B00
Point table no./program No. selection 2	DI2	CN1-41	DI-1	PD14	3920
Forced stop 2	EM2	CN1-42	DI-1	(Non)	-
Forward rotation stroke end	LSP	CN1-43	DI-1	PD18	0A00
Reverse rotation stroke end	LSN	CN1-44	DI-1	PD20	0B00
Proximity dog	DOG	CN1-45	DI-1	PD22	2B23

3C08h

(1) Set PD10 from 0808 to **3C**08.

PD10	Any input device can be assigned to the CN1-18 pin.		
*DI4H	x x	Not used with the positioning mode.	08h
Input device selection 4H	x x _ _	Positioning mode Device selection	**3Ch**

set value	Input device (Note1)		
	CP	CL	PS
0 2 _ _	SON	SON	SON
0 3 _ _	RES	RES	RES
0 4 _ _	PC	PC	PC
0 5 _ _	TL	TL	TL
0 6 _ _	CR	CR	CR
0 7 _ _	ST1	ST1	ST1
0 8 _ _	ST2	ST2	
0 9 _ _	TL1	TL1	TL1
0 A _ _	LSP	LSP	LSP
0 B _ _	LSN	LSN	LSN
0 D _ _	CDP	CDP	CDP
0 F _ _	MECR	MECR	
1 2 _ _	MSD	MSD	
1 E _ _	CLTC	CLTC	
1 F _ _	CPCD	CPCD	
2 0 _ _	MD0	MD0	MD0
2 1 _ _	CAMC	CAMC	MD1
2 3 _ _	TCH		
2 4 _ _	TP0	TP0	
2 5 _ _	TP1	TP1	
2 6 _ _	OVR	OVR	
2 7 _ _	TSTP	TSTP	
2 9 _ _	CI0	CI0	
2 A _ _	CI1	CI1	
2 B _ _	DOG	DOG	SIG
2 C _ _	SPD1		
2 D _ _	SPD2		
2 E _ _	SPD3		
2 F _ _	SPD4		
3 0 _ _		LPS	
3 1 _ _	CI2	CI2	RT
3 2 _ _			RTCDP
3 4 _ _		PI1	OV0
3 5 _ _		PI2	OV1
3 6 _ _		PI3	OV2
3 7 _ _	CI3	CI3	OV3
3 8 _ _	DI0	DI0	DI0
3 9 _ _	DI1	DI1	DI1
3 A _ _	DI2	DI2	DI2
3 B _ _	DI3	DI3	DI3
3 C _ _	DI4	DI4	DI4
3 D _ _	DI5	DI5	DI5
3 E _ _	DI6	DI6	DI6
3 F _ _	DI7	DI7	DI7

Note1 CP: Positioning mode (Point table method)
CL: Positioning mode (Program method)
PS: Positioning mode (Indexer method)

(2) Example of signal allocation by setup software

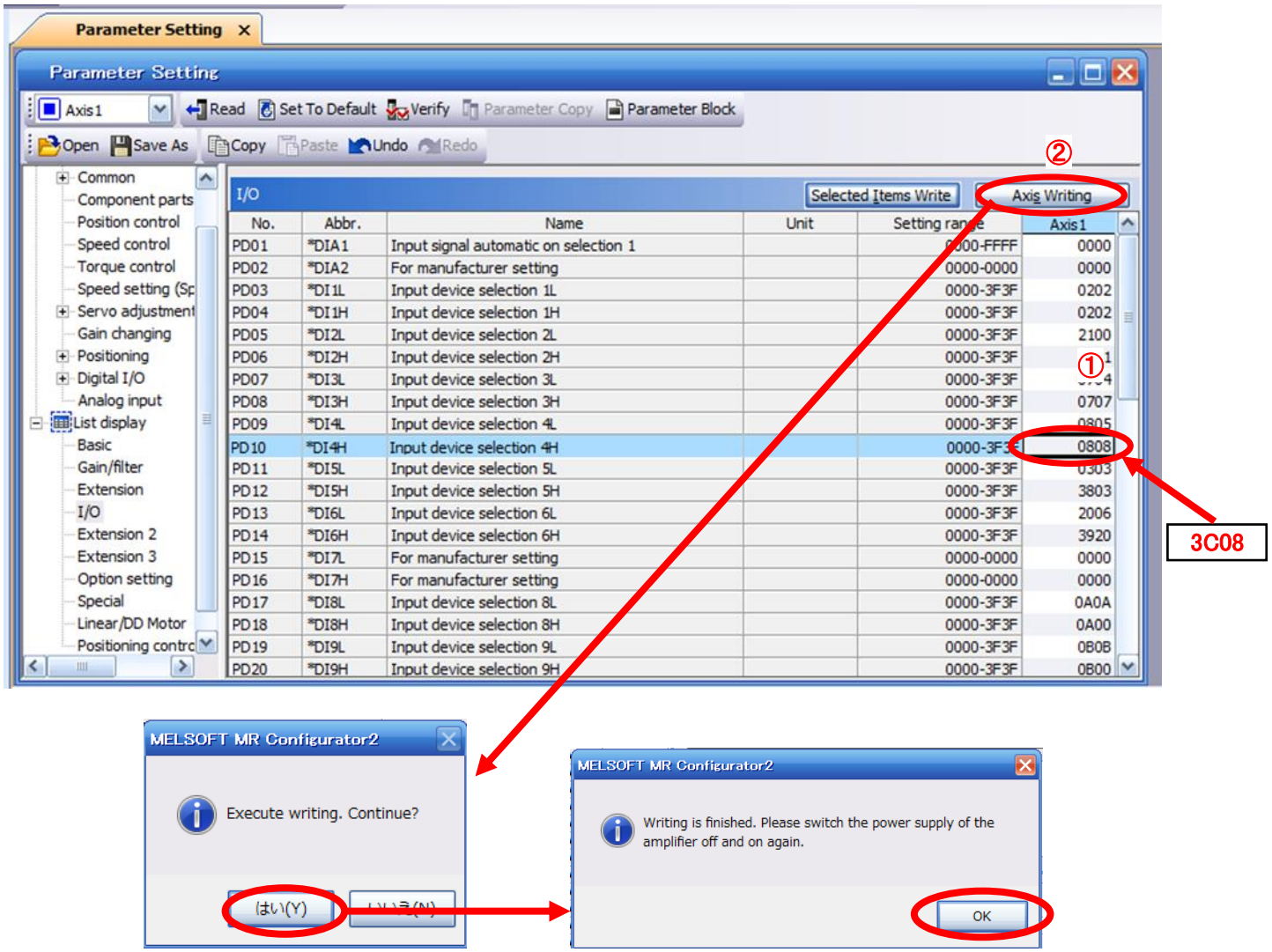
When changing CN1-18 pin "Reverse rotation start" (ST2) to "Point table No./Program No. selection 5" (DI4).

(1) Set " PD10 " from "0808 " to " 3C08 " on the " I/O" tab in the List display.

* Allocation of I/O signals can also be performed from the "Basic" tab of the Digital I/O. For details, refer to "LECSB2-T□ Operation Manual (Simplified Edition)", section 5.5.8 (2).

(2) Click the "Axis Writing" button.

(3) **Turn off the power and then turn it on again. The parameters will be enabled.**



* Wire the CN1-18 pins separately.

* The parameter setting values when assigning input signals to pins CN1-15 ~ CN1-19, CN1-41, CN1-43 ~ CN1-45, CN1-10 /CN1-37, CN1- 35 /CN1-38, refer to "LECSB2 -T Operation Manual, section 16.22.4" (PD03 ~ PD14, PD17 ~ PD22, PD43 ~ PD46).

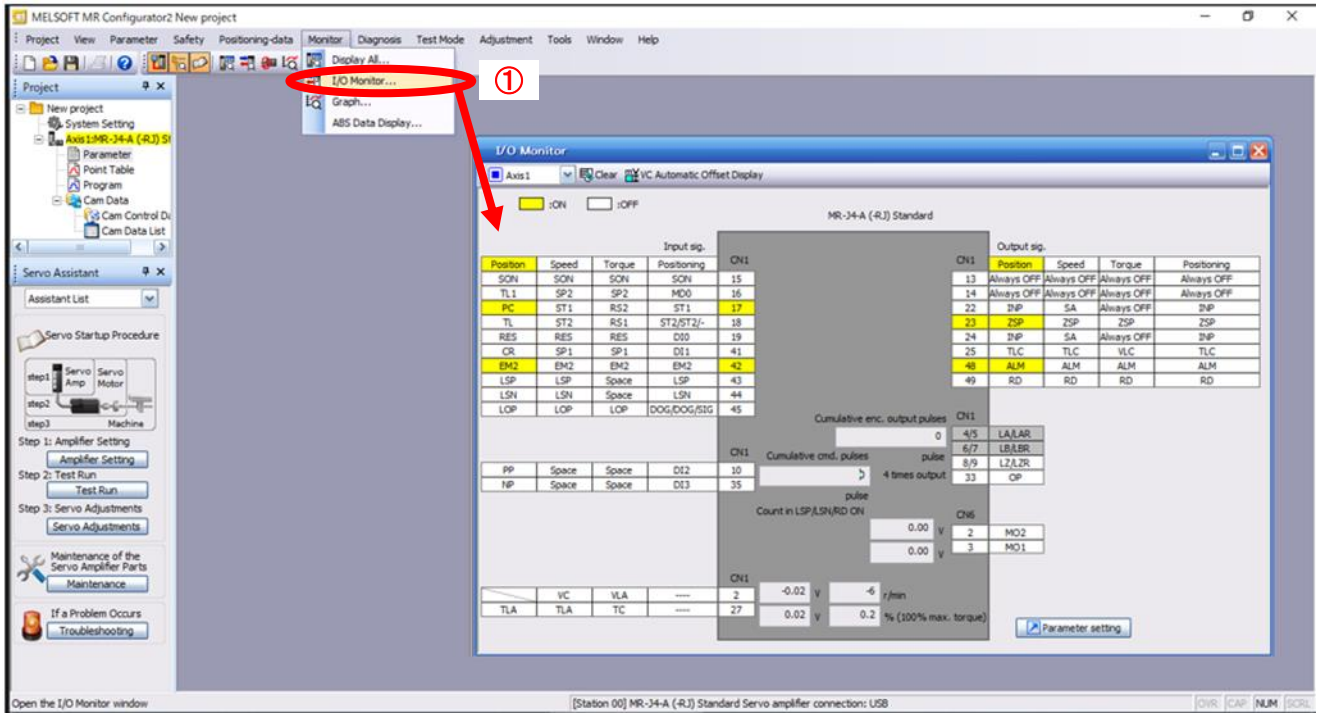
* The parameter settings values when assigning output signals to pins CN1- 22 ~ CN1-25, CN1- 49, CN1-13 /CN1-14, refer to "LECSB2 -T Operation Manual, section 16.22.4" (PD23 ~ PD26, PD28, PD47).

5.5.7 I/O Signal Allocation Check

The signal names allocated to CN1 and the "ON"/"OFF" status (including wiring confirmation) can be checked.
When changing the parameters of "PD03" ~ "PD14", "PD17" ~ "PD26", "PD28", "PD43" ~ "PD47",
Check if it is assigned normally.

(1) Click "Monitor" - "I/O Monitor" in the setup software to display the "I/O monitor" window.

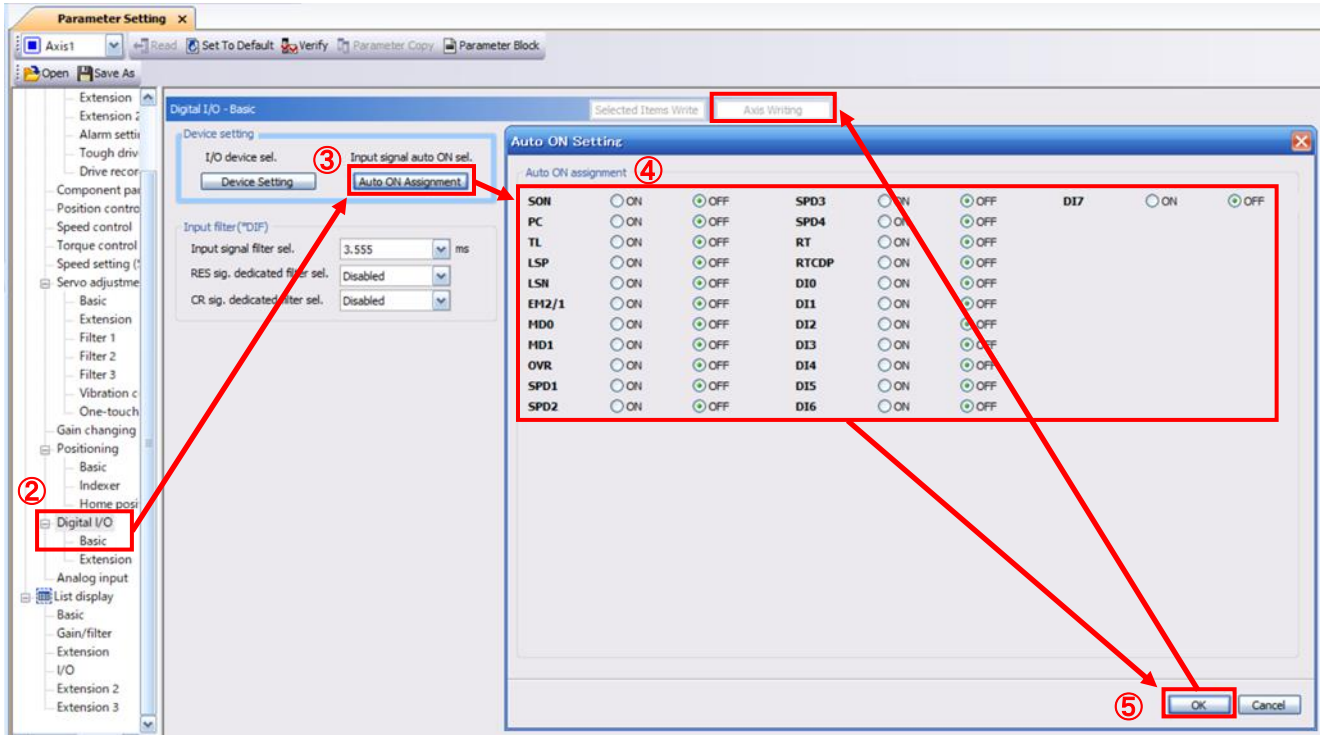
Example of Positioning mode (Point table)



5.5.8 How to change the allocation from Digital I/O – Basic Tab

(1) How to change the input signal automatic ON selection from Digital I/O "Basic" tab.

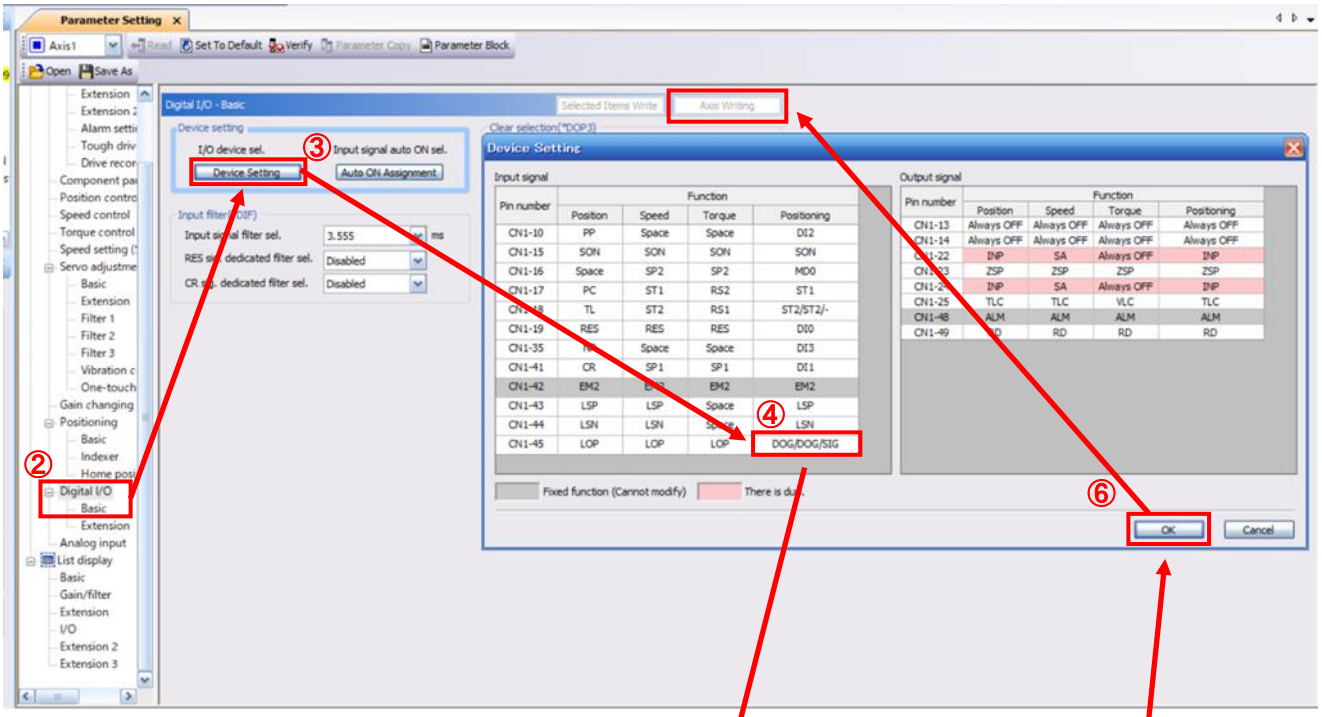
(1) Click "Parameter" - "Parameter Setting" in the setup software to display the "Parameter Setting" window.
(2) Click the "Basic" tab in Digital I/O.
(3) Click “Auto ON Assignment" button to display the "Auto ON Setting" window.
(4) Set the signal to turn ON automatically.
(To turn SON on automatically, check the ON mark.)
(5) Click “OK” button, and then click the "Axis Writing" button.
* When changing the allocation on this window, it will be automatically reflected in the corresponding parameter of "I/O" in the List display.

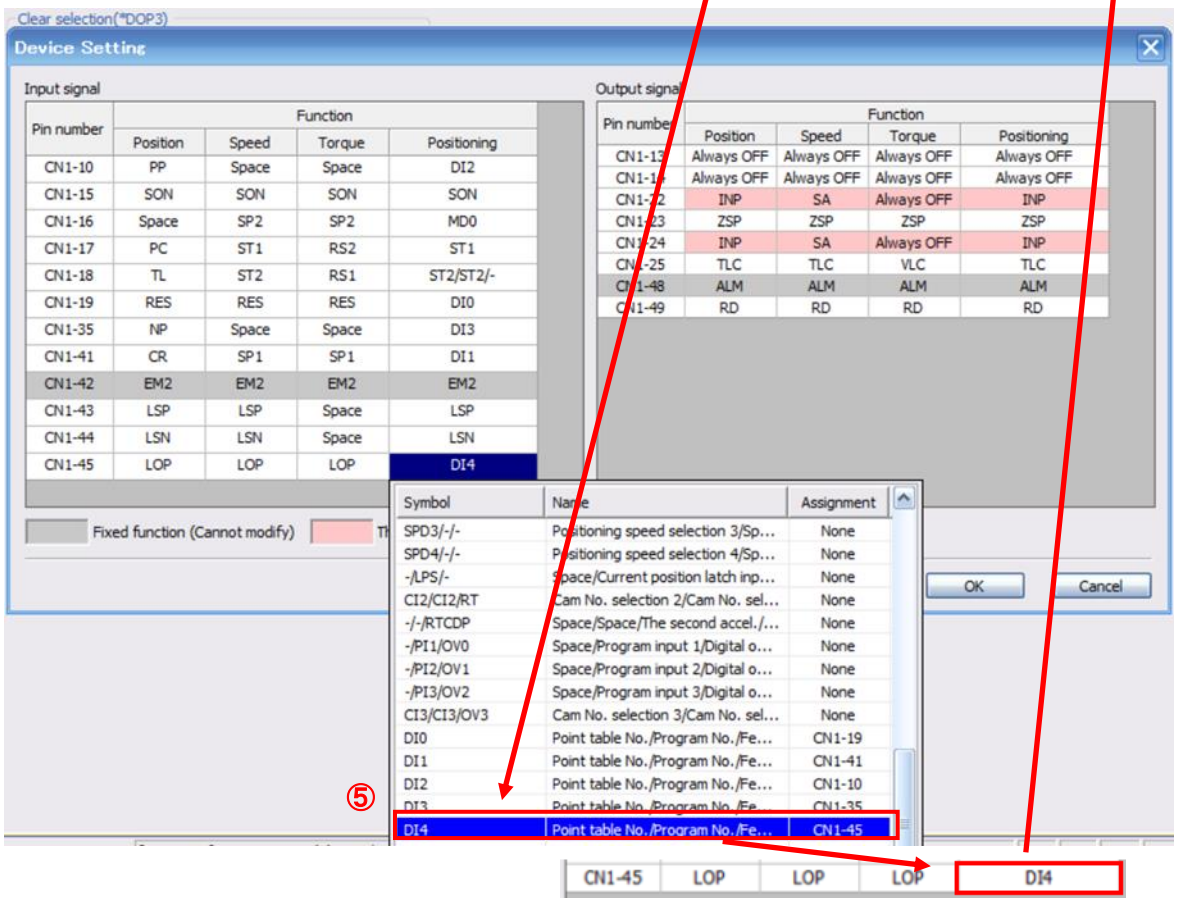


(2) How to change the input and output signals from Digital I/O "Basic" tab.

(1) Click "Parameter" - "Parameter Setting" in the setup software to display the "Parameter Setting" window.
(2) Click the "Basic" tab in Digital I/O.
(3) Click “Device Setting" button to display the "Device Setting" window.
(4) Click the signal to change the allocation and change the signal.
(5) When changing “Input signal” - “Pin number” - “CN1-45” - “DOG” to “DI4”, Click the DOG cell and select DI4 to change the display to DI4.
(6) Click “OK” button, and then click the "Axis Writing" button.

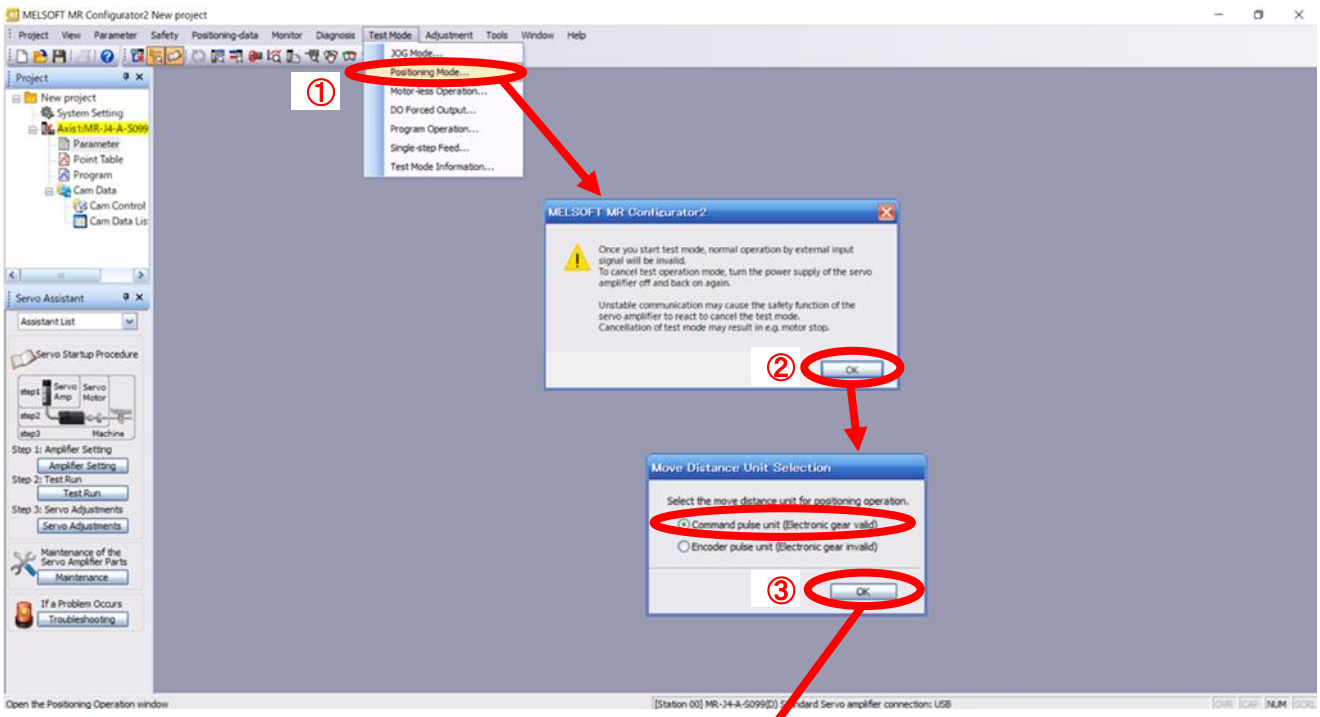
* When changing the allocation on this window, it will be automatically reflected in the corresponding parameter of "I/O" in the List display.

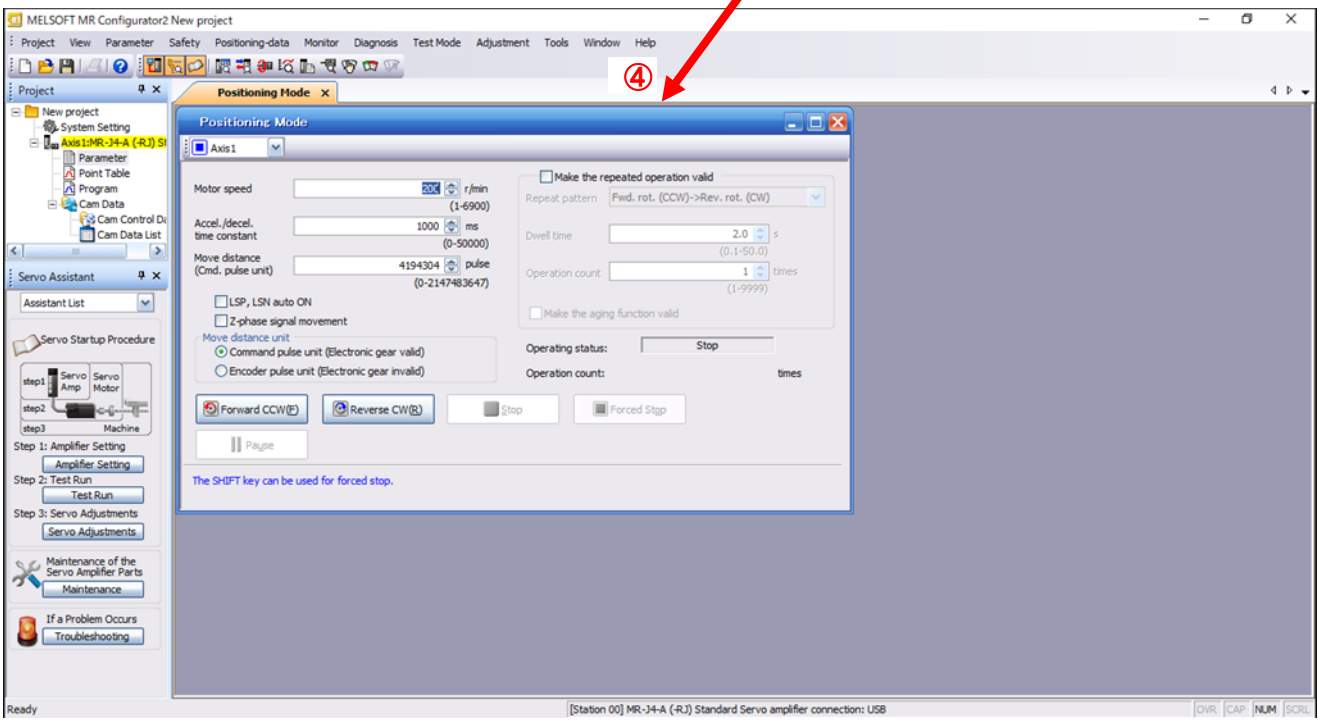




5.6 Positioning Operation using Setup Software

(1) Click "Test Mode" - "Positioning Mode" in the setup software to display the "Move Distance Unit Selection" window.
(2) Click “OK” button.
(When using this function, external input signal operation is disabled. When controlling from a PLC or host device, be sure to turn off the power and then turn on the power again before using.)
(3) Check the “Command pulse unit (Electronic gear valid)” and click "OK".
The electronic gear ratio set by PA21/PA06/PA07 is enabled.
(4) The "Positioning Mode" window will be displayed.





5.6.1 Positioning Operation

(1) Operate the actuator at low speed at first so that it does not accidentally collide with the end of the stroke. When changing the speed or amount of movement, increase it gradually and operate while checking.
Refer to "LECSB2-T□ Operation Manual (Simplified Edition), section 5.6.2" for setting the motor speed.
Refer to "LECSB2-T □ Operation Manual (Simplified Edition), section 5.6.3" for setting the acceleration/deceleration time constant.
Refer to "LECSB2-T □ Operation Manual (Simplified Edition), section 5.6.4" for setting the travel amount.

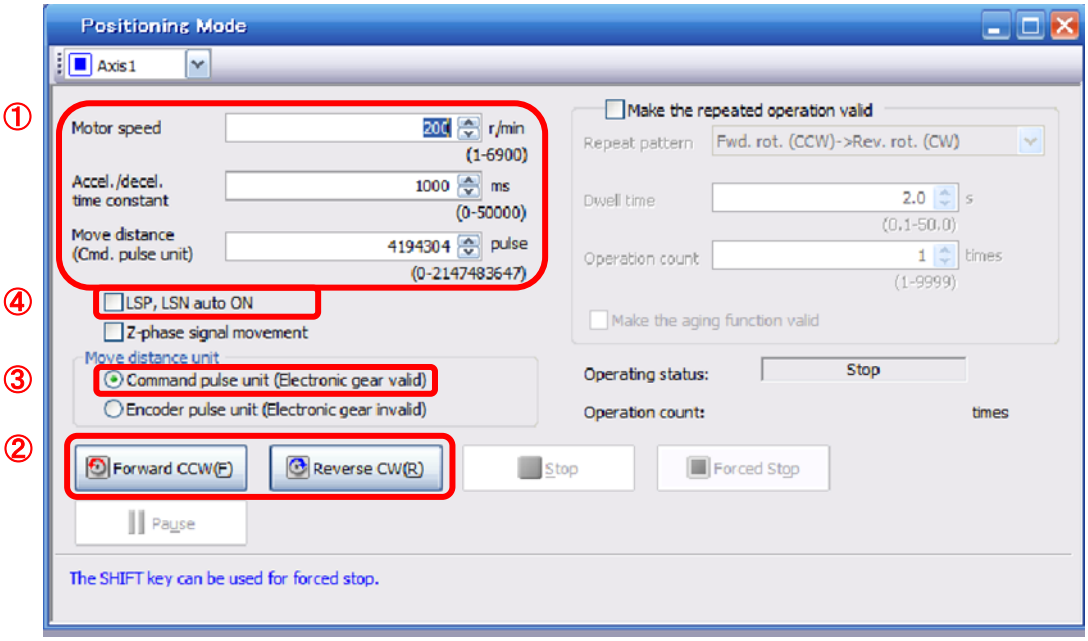
(2) The actuator performs positioning operation with “Forward CCW(F)” and “Reverse CW(R)”.
(If it does not work , check the wiring and parameters.)
When performing positioning operation using the setup software, changing the setting of parameter "PA14 (Rotation direction selection)" does not change the movement direction of the actuator (motor rotation direction).
The actuator moves in the direction of “Forward CCW(F)” button and “Reverse CW(R)” button.

(3) Check the “Command pulse unit (Electronic gear valid)”.
The electronic gear ratio set by PA21/PA06/PA07 is enabled.
For the setting values of PA21/PA06/PA07 for each actuator, refer to "LECSB2-T Operation Manual Appendix 11".
When PA21/PA06/PA07 are set with the values in the "LECSB2-T Operation Manual Appendix 11", the "actuator movement amount per pulse" is as follows.

【Position control mode (Pulse input)】
- Movement amount of actuator per pulse = 10 [μm] (= 0.01 [mm])

【Positioning (Point table)】
- Movement amount of actuator per pulse = 1 [μm] (= 0.001 [mm])

(4) If the "Stroke end" (LSP, LSN) signals are not set to turn on automatically, an alarm will occur.
Please check the box.
(If checked, the "Stroke end" (LSP, LSN) signal will automatically turn ON only when this window is open.)



Item	Setting range	Unit	Description
Motor speed	0 ~ Allowed Speed for each actuator	r/min	Set the command rotation speed (**motor rotation speed per minute**) when positioning is executed.
Acceleration/ deceleration time constant	0 ~ 50000	ms	Set **the time to reach/stop the rated speed (3000 r/min)**.
Amount of movement	0 ~ 2147483647	pulse	Set the amount of movement.

5.6.2 Motor Speed Setting

<Rotation speed setting>

(1) Set the motor rotation speed (r/min)

* r/min(rpm): Motor command rotation speed (motor rotation speed per minute)

rotation speed to a value between 0 and the allowable speed range of each actuator.
Please note that if 0 is set, the actuator will not operate.

If the rotation speed (r/min) is too low, it may cause vibration, so set it while observing the operation of the actuator.

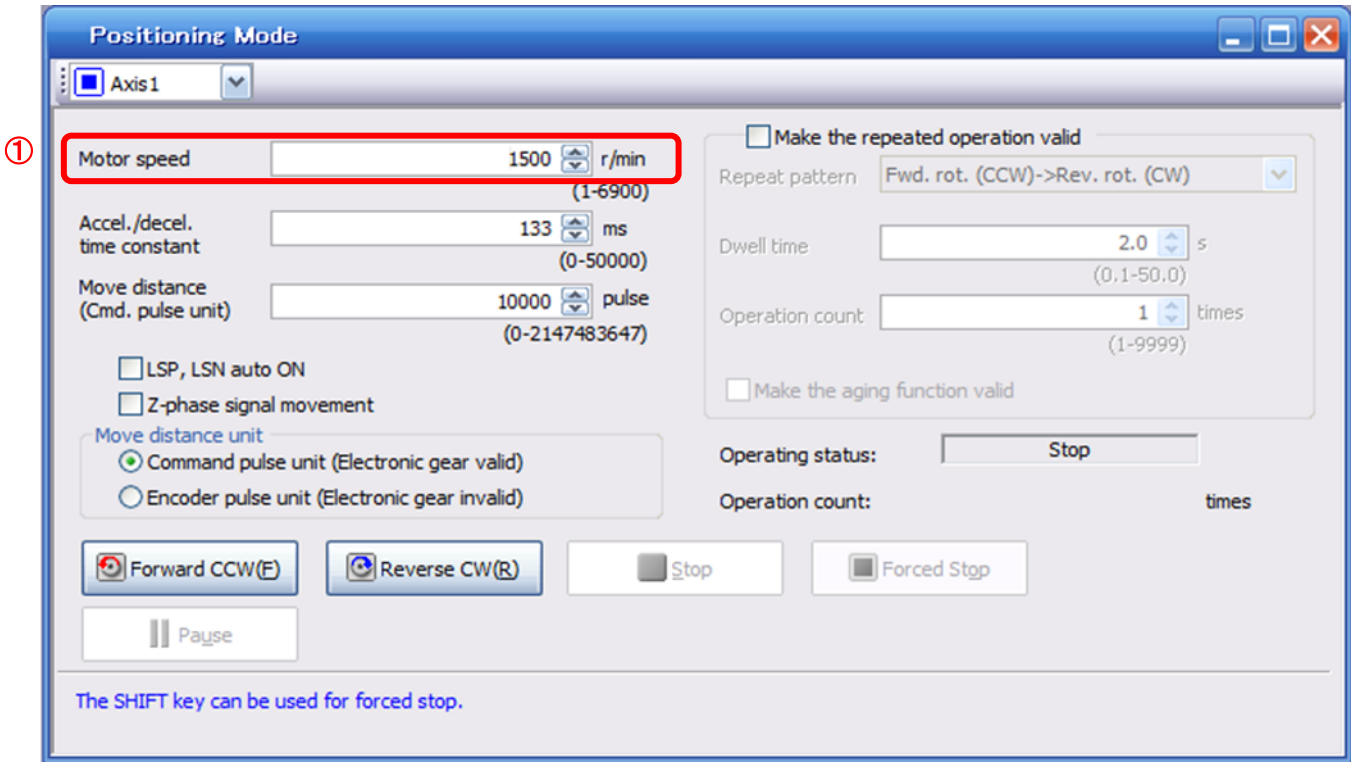
The rotation speed (r/min) must be converted from the moving speed (mm/s).
Refer to the following for the conversion method.

Conversion example when moving an actuator with a lead of 20 [mm] at a moving speed of 500 [mm/sec]

Rotation / s

Moving distance / s ÷ Moving distance / 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 Constant Setting

<Acceleration/deceleration time constant setting>

(1) Set the acceleration/deceleration time constant (ms).
The acceleration/deceleration time constant is set by the time (ms) to reach the rated rotation (3000[r/min]).
Acceleration/deceleration time constant to a value within the allowable acceleration/deceleration range of each actuator.

The acceleration/deceleration time constant (ms) must be converted from the acceleration/deceleration speed (mm/s^2).
Refer to the following for the conversion method.

Conversion example when moving an actuator with a lead of 8 [mm] at an acceleration of 3000 [mm/sec^2]

Speed at Motor rated rotation (3000rpm)

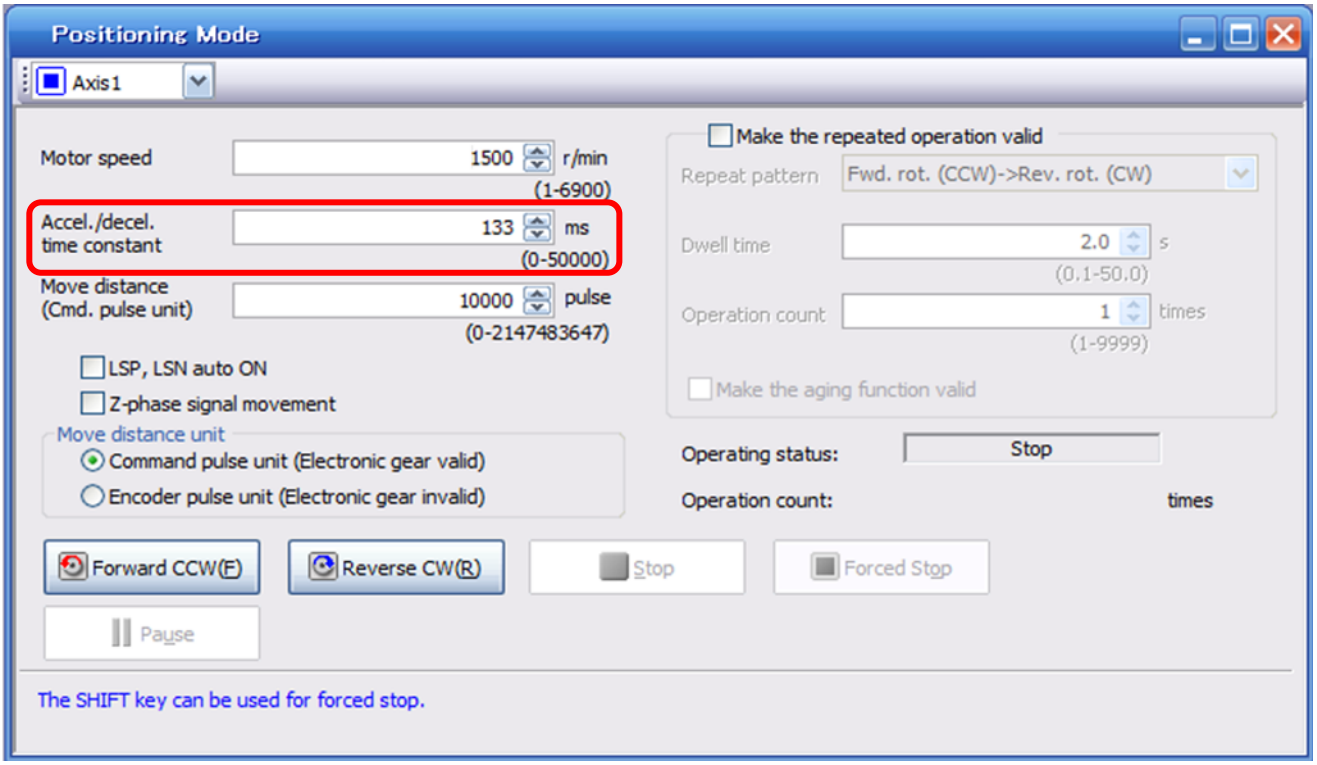
$$\text{Accel/decel time } \textbf{constant (ms)} = \frac{\{\text{Rated Rotation Speed (r/min)} \div 60\ (S)\} \times \text{Screw Lead (mm)} \times 1000}{\text{Acceleration / deceleration speed (mm/s}^2\text{)}}\ ^{*\ \text{Note)}}$$

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

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

$$= 133\ (\text{ms})$$

(The rated rotation speed is a fixed value of 3000 rpm.)



5.6.4 Movement Amount Setting and Operation

<Movement amount setting>

(1) Set the movement amount [pulse]. Set a value within the stroke range.

(2) The actuator performs positioning operation with “Forward CCW(F)” and “Reverse CW(R)”.
(If it does not work , check the wiring and parameters.)
When performing positioning operation using the setup software, changing the setting of parameter "PA14 (Rotation direction selection)" does not change the movement direction of the actuator (motor rotation direction).
The actuator moves in the direction of “Forward CCW(F)” button and “Reverse CW(R)” button.

(3) Check the “Command pulse unit (Electronic gear valid)”.
The electronic gear ratio set by PA21/PA06/PA07 is enabled.
For setting values of PA21/PA06/PA07 for each actuator, refer to "LECSB2-T Operation Manual Appendix 11".
When PA21/PA06/PA07 are set with the values in the "LECSB2-T Operation Manual Appendix 11", the "actuator movement amount per pulse" is as follows.

【Position control mode (Pulse input)】
- Movement amount of actuator per pulse = 10 [μm] (= 0.01 [mm])

【Positioning (Positioning)】
- Movement amount of actuator per pulse = 1 [μm] (= 0.001 [mm])

The movement amount (Pulse) must be converted from the movement amount (mm).
Refer to the following for the conversion method.

Example for movement amount 100mm;

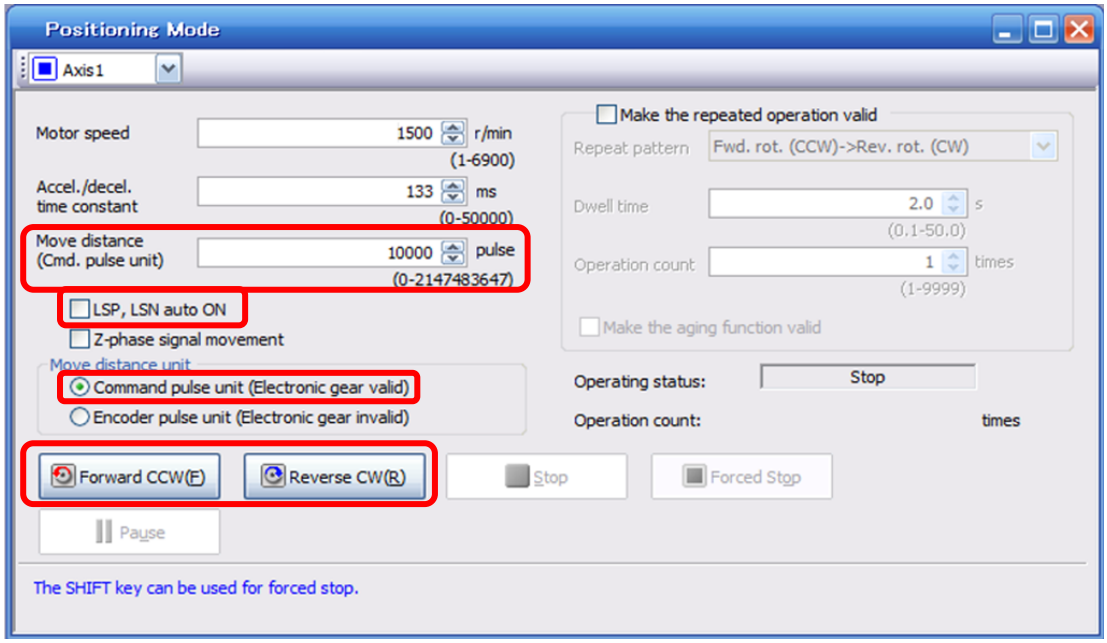
【Position control mode (Pulse input】
Since the movement amount of the actuator per 1 pulse = 0.01 (mm) *1
100 (mm) / 0.01 (mm) = 10000 (pulse) will be setting.

【Positioning (Positioning】
Since the movement amount of the actuator per 1 pulse = 0.001 (mm) *1
100 (mm) / 0.001 (mm) = 100000 (pulse) will be setting.

*1 The movement amount of the actuator per pulse is " LECSB2-T□ Operation Manual Appendix 11
This is the case when the electronic gear (PA21/PA06/PA07) is set.

(4) If the "Stroke end" (LSP, LSN) signals are not set to turn on automatically, an alarm will occur.
Please check the box.
(If checked, the "Stroke end" (LSP, LSN) signal will automatically turn ON only when this window is open.)

* Be sure to check the operation direction of Forward CCW and Reverse CW.
If you do not know the direction of movement, set a small value for the movement amount and then check the direction of movement.



5.7 Positioning Operation (Point Table) using Setup Software

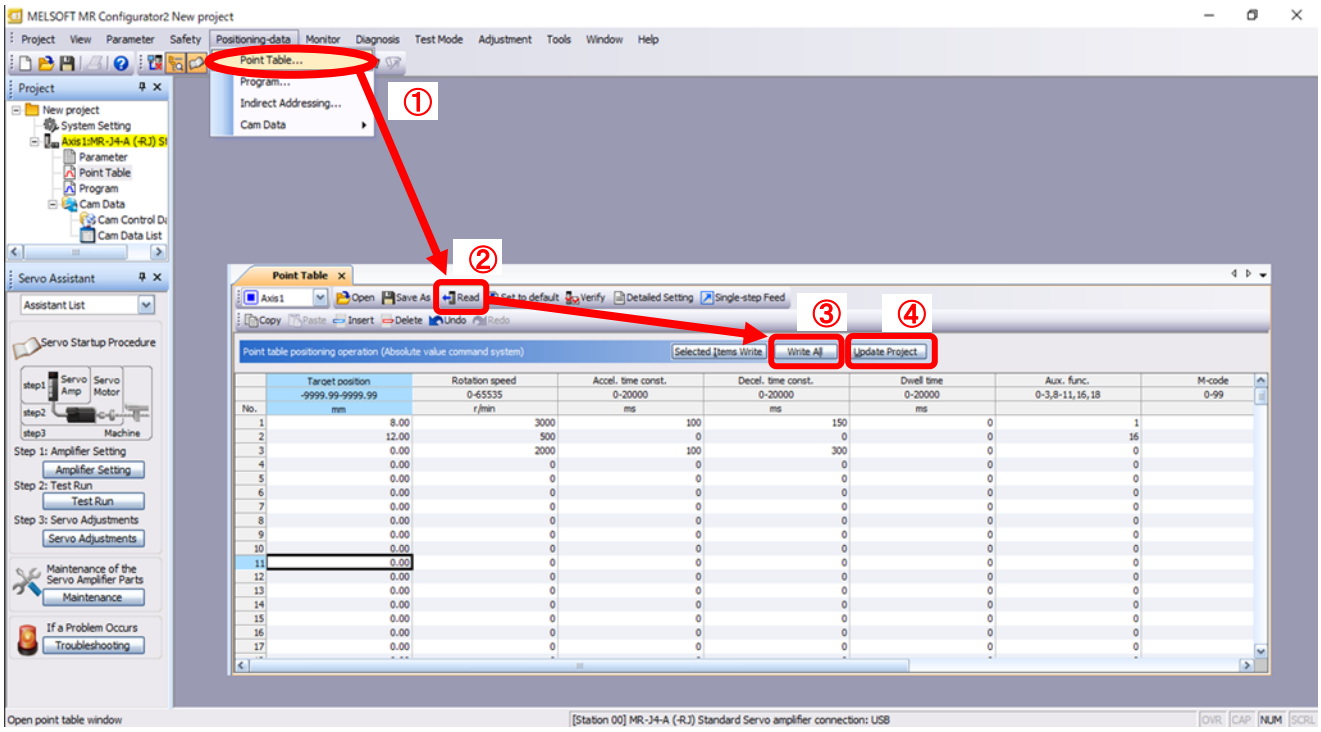
This function is valid only in positioning (point table) mode.

When performing positioning operation in positioning (point table) mode, it is necessary to set the point table (target position, rotation speed, acceleration time constant, deceleration time constant, etc.).

5.7.1 Point Table List

(1) Click "Positioning data" - "Point Table" in the setup software to display the "Point Table" window.
(2) Click "Read" button: Point table data is read from LECSB2-T and displayed.
(3) Click the "Write All" button: Data in the point table is written to LECSB2-T.

* When updating (reflect) the point table data in the project, click "Update Project" button.
(Refer to “LECS B2 -T □ Operation Manual (Simplified Edition), section 5.9.1” for how to save a project.)



5.7.2 Point Table Data

The data registration method of the point table changes depending on the setting of the parameter "PT01: Command mode selection".

(1) Parameter "PT01: Command mode selection" setting is “0000: Absolute value command system/mm unit”

Item	Setting range	Unit	Description
Target position	-999.999 ~ 999.999	× 10 ^{STM} mm	(1) When using this point table as absolute value command system. (Refer to auxiliary function item) Set the target position (absolute value). (2) When using this point table as incremental value command system. (Refer to auxiliary function item) Set the movement amount (increment value) " - " sign indicates a reverse rotation command. **The number of digits is changed by STM (Feed length multiplication).**
Rotation speed	0 ~ allowable speed of each actuator	r/min	Set the command rotation speed (**Motor rotations per minute**) when positioning is executed.
Acceleration time constant	0 ~ 20000	ms	**Set the time to reach the rated rotation speed (3000 r/min)**.
Deceleration time constant	0 ~ 20000	ms	**Set the time to stop rated rotation speed (3000 r/min)**.
Dwell	0 ~ 20000	ms	When the dwell is set, the position command for the selected point table is completed, and after the set dwell elapses, the position command for the next point table is started. Auxiliary function to " 0" or " 2" disables the dwell. Set the auxiliary function to " 1", " 3", " 8" or " 9", and when the dwell time is 0, the speed change operation iwill be performed.
Auxiliary function	0 ~ 3 , 8 ~ 11		(1) When using this point table with the absolute value command system 0: Selected one point table automatic operation 1: Automatic continuous operation without stopping the next point table 8: Automatic continuous operation to the selected point table at startup 9: Automatic continuous operation to point table number 1 (2) When using this point table with the incremental value command method 2: Selected one point table automatic operation 3: Automatic continuous operation without stopping the next point table 10: Automatic continuous operation to the selected point table at startup 11: Automatic continuous operation to point table number 1 If a different direction of rotation is set, the motor rotates in the reverse direction after smoothing zero (command output) is confirmed. If "1" or "3" is set in point table number 255, [AL. 61] will occur when executing the point table.
M-code	0 ~ 99		This code is output when positioning is completed. M code is used only for RS-422 communication. The 1st and 2nd digits of the M code are each output in 4-bit binary.

(2) Parameter "PT01: Command mode selection" setting is “0001: Incremental value command method/ mm unit”

Item	Setting range	Unit	Description
Position data	0 ~ 999.999	× 10 ^{STM} mm	Set the movement amount (increment value). ("-" sign cannot be set) **The number of digits is changed by STM (Feed length multiplication).**
Servomotor Rotation speed	0 ~ allowable speed of each actuator	r/min	Set the command rotation speed (**Motor rotations per minute**) when positioning is executed.
Acceleration time constant	0 ~ 20000	ms	**Set the time to reach the rated rotation speed (3000 r/min)**.
Deceleration time constant	0 ~ 20000	ms	**Set the time to stop rated rotation speed (3000 r/min)**.
Dwell	0 ~ 20000	ms	When the dwell is set, the position command for the selected point table is completed, and after the set dwell elapses, the position command for the next point table is started. Auxiliary function to " 0" disables the dwell. Set the auxiliary function to " 1", " 8" or " 9", and when the dwell time is 0, the speed change operation will be performed.
Auxiliary function	0 , 1 , 8 , 9		0: Selected one point table automatic operation 1: Automatic continuous operation without stopping the next point table 8: Automatic continuous operation without stopping the selected point table at startup 9: Automatic continuous operation without stopping point table number 1. If "1" is set in point table number 255, an error will occur.
M-code	0 ~ 99		This code is output when positioning is completed. M code is used only for RS-422 communication. The 1st and 2nd digits of the M code are each output in 4-bit binary.

5.7.3 Point Table (Target Position) Setting

<Target position setting>

(1) Set the parameter "PT01 ('Command mode selection' - 'Position data unit ')" to "0□0□".

Set the position data unit ([Pr. PT01]).

[Pr.PT01] Setting	Position data unit
_ **0** _ _	**mm**
_ 1 _ _	inch
_ 2 _ _	degree
_ 3 _ _	pulse

(2) Change the parameter "PT03 ('Feed function selection' - ' Feed length multiplication (STM)')" according to **the stroke length of the actuator**.
If the parameter "PT03 ("Feed function selection" - " Feed length multiplication (STM)") is changed, "Detailed setting" - "Feed length multiplication (STM) (times)" in "Point table setting" will automatically be changed.
The parameter "PT03 ('Feed function selection' – 'Feed length multiplication (STM)')" and "Detailed setting" - " Feed length multiplication (STM)" of "Point table setting" to the same setting.

The stroke of the actuator is less than 1000mm, set the parameter "PT03 ('Feed function selection' – 'Feed length multiplication (STM)')" to "**0000**", and make sure that "Point table setting" - "Detailed setting" - "Feed Length Multiplication (STM) (Times)" value is set to **"1 time"**.

The stroke of the actuator is 1000mm or more, set the parameter "PT03 ('Feed function selection' – 'Feed length magnification (STM)')" to " **0001**", and make sure that "Point table setting" - "Detailed setting" - "Feed Length Multiplication (STM) (times)" value is set to **"10 times".**

Set Feed length multiplication ([Pr. PT03]) and Feed length multiplication (STM) of the position data.

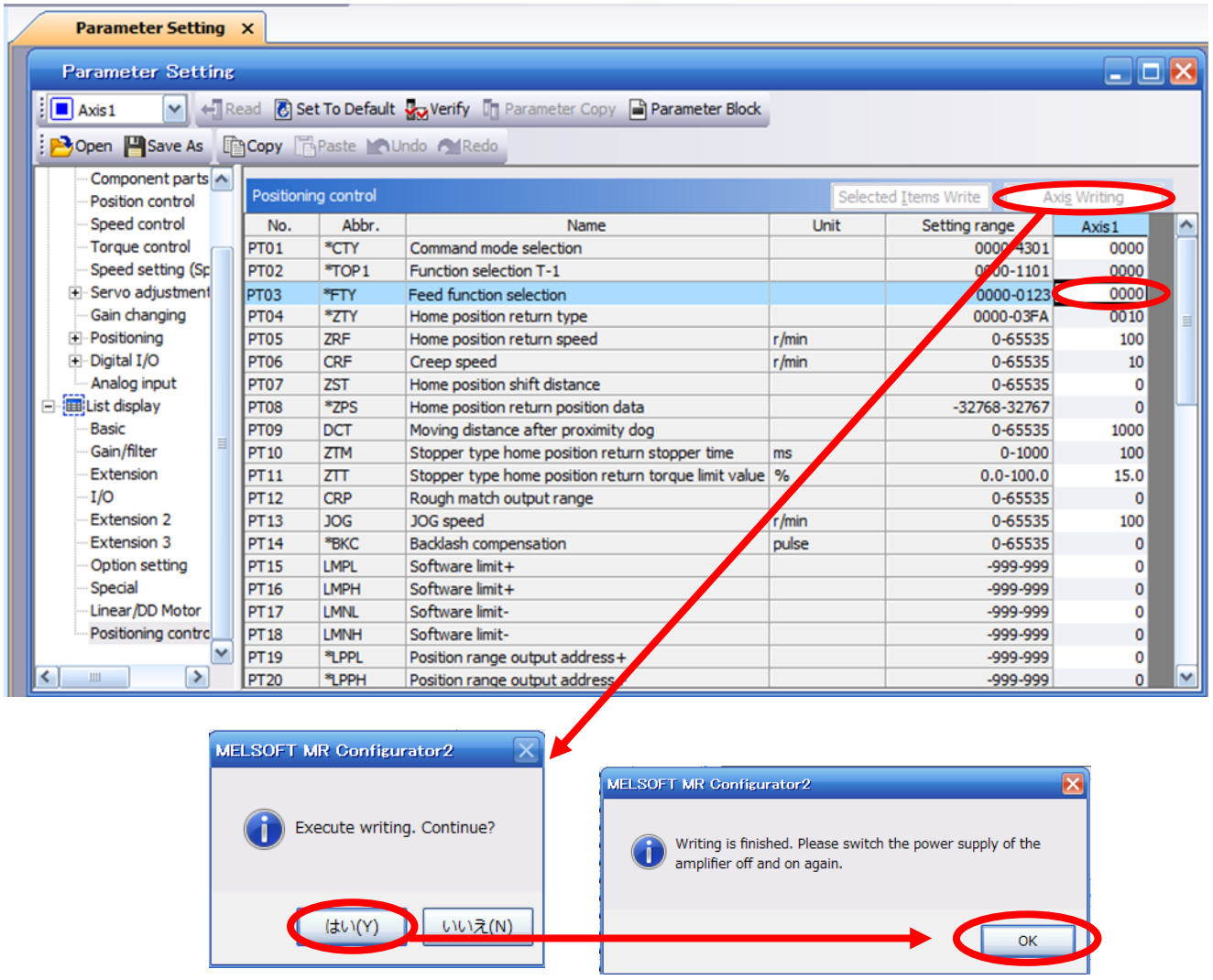
[Pr.PT03] setting	Position data input range [Pr. PT01] setting			
	[mm]: **(_ 0 _ _)**	[inch]: **(_ 1 _ _)**	[degree]:**(_ 2 _ _)** (Note1)	[pulse]: **(_ 3 _ _)** (Note1)
_ _ _ 0	- 999.999 ~ + 999.999	- 99.9999 ~ + 99.9999	- 360.000 ~ + 360.000 (Note2)	- 999999 ~ + 999999 (Note2)
_ _ _ 1	- 9999.99 ~ + 9999.99	- 999.999 ~ + 999.999		
_ _ _ 2	- 99999.9 ~ + 99999.9	- 9999.99 ~ + 9999.99		
_ _ _ 3	- 999999 ~ + 999999	- 99999.9 ~ + 99999.9		

Note1 Feed length multiplication ([Pr. PT03]) setting is not reflected in the unit multiplication.
When changing the unit magnification, adjust it with the electronic gear setting ([Pr. PA06] and [Pr. PA07]).

Note2 "-" differs depending on whether the absolute value command method or the incremental value command method is used.

Parameter "PT03 (Feed selection function)" Changing

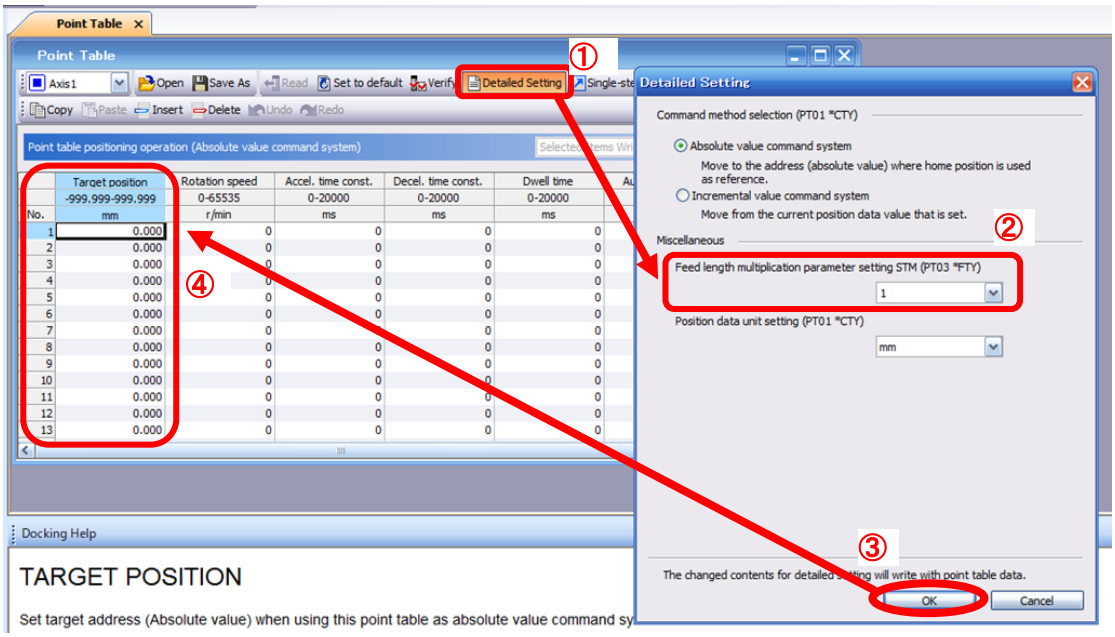
(1) Set "PT03" in the "Positioning control" tab.
(2) Click the "Axis writing" button.
(3) **Turn off the power and then turn it on again. The parameters will be enabled.**



Changing the position data input range of the target position

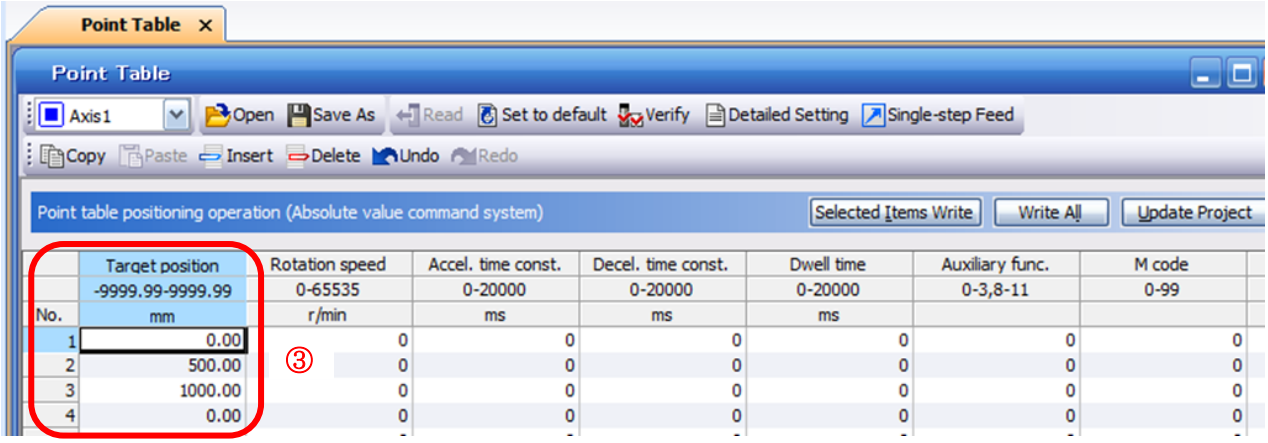
(1) Click the "Detailed Setting" button in the “Point Table" tab.
(2) Make sure or change the **"Feed length multiplication (STM) (times)"**.
(3) Click the "OK" button.
(4) The position data input range of the target position changes depending on **the set value of Feed length magnification (STM) (times).**

[Pr. PT03] setting	Position data input range [mm]
_ _ _ 0	- 999.999 ~ + 999.999
_ _ _ 1	- 9999.99 ~ + 9999.99
_ _ _ 2	- 99999.9 ~ + 99999.9
_ _ _ 3	- 999999 ~ + 999999



The stroke of the actuator is less than 1000mm, set the parameter "PT03 (‘Feed function selection’ – ‘Feed length multiplication (STM)’)" to "**0000**", and make sure that "Point table setting" - "Detailed setting" - "Feed Length Multiplication (STM) (Times)" value is set to **"1 time"**.
The stroke of the actuator is 1000mm or more, set the parameter "PT03 (‘Feed function selection’ – ‘Feed length magnification (STM)’)" to " **0001**", and make sure that "Point table setting" - "Detailed setting" - "Feed Length Multiplication (STM) (times)" value is set to **"10 times".**

(3) Set the target position (mm). Set a value within the stroke range.



* The electronic gear (PA21/PA06/PA07) of " LECSB2 -T Operation Manual Appendix 11 " is set in positioning mode, the minimum unit for actuator movement will be **1 [μm] (= 0.001 [mm])**.

5.7.4 Point Table (Rotation Speed) Setting

<Rotation speed setting>

(1) Set the rotation speed (r/min).

* r/min(rpm): Motor command rotation speed (motor rotation speed per minute).

The the rotation speed (r/min) must be converted from the movement speed (mm/s).
Refer to the following for the conversion method.

Conversion example when moving an actuator with a lead of 20 [mm] at a movement speed of 500 [mm/sec]

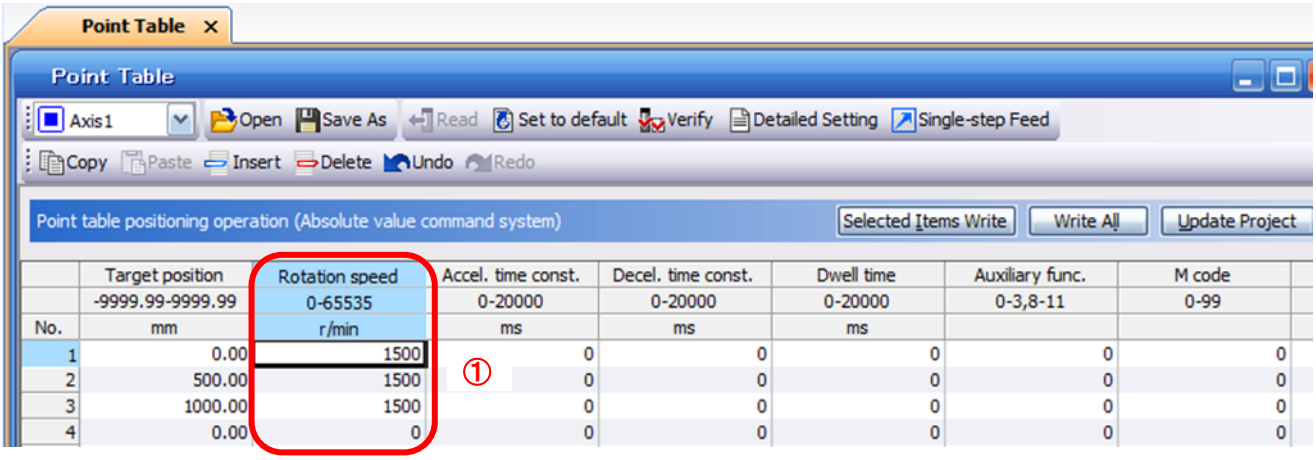
Rotation (rps) / s

Moving distance / s ÷ Moving distance / rotation

Rotation Speed (rpm) = {Speed (mm/s) ÷ Lead (mm) } × 60 (S)
= {500 (mm/s) ÷ 20 (mm) } × 60 (s) = 1500 (rpm)

The rotation speed to a value between 0 and the allowable speed range of each actuator.
Please note that if 0 is set, the actuator will not operate.

The rotation speed (r/min) is too low, it may cause vibration, so set it while observing the operation of the actuator.



5.7.5 Point Table (Acceleration Time Constant and Deceleration Time Constant) Setting

<Acceleration time constant and deceleration time constant setting>

(1) Set the acceleration time constant (ms) and the deceleration time constant (ms).

The acceleration/deceleration time constant (ms) must be converted from the acceleration/deceleration (mm/s^2). Refer to the following for the conversion method.

Conversion example when moving an actuator with a lead of 8 [mm] at an acceleration of 3000 [mm/se^2]

Rated Motor Rotation Speed (mm/s)

Acceleration / deceleration time constant (ms) = $\frac{\{\text{Rated rotation speed (r/min)} \div 60\ (S)\ \} \times \text{screw lead (mm)} \times 1000}{\text{Acceleration/deceleration speed (mm/s}^2\text{)}}$ *Note)

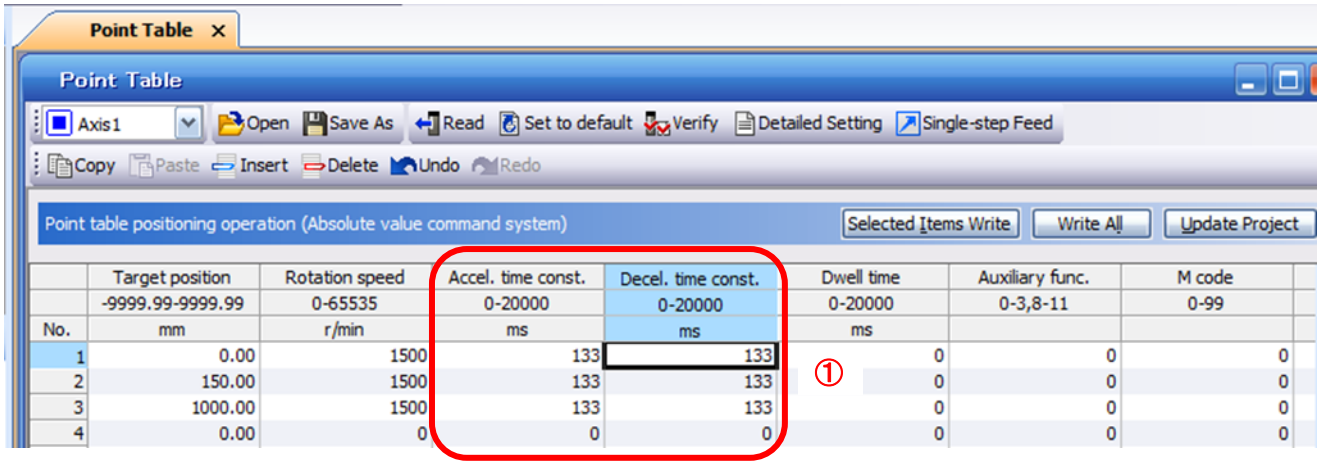
***As the scceleration/deceleration time constant units are in ms; this is calculated as (s) ×1000**

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

= 133 (ms)

(The rated rotation speed is a fixed value of 3000 rpm.)

The acceleration time constant/deceleration time constant is set as the time (ms) it takes to reach the rated rotation speed (3000 [r/min]).
The acceleration time constant/deceleration time constant must be within the allowable acceleration/ deceleration range of each actuator.



5.7.6 Positioning (Pushing Operation) Setting

When using the positioning (pushing operation) mode, refer to "LECSB2-T□ Operation Manual, Chapter 17 " to set the point table.

5.7.7 1 Step Feed

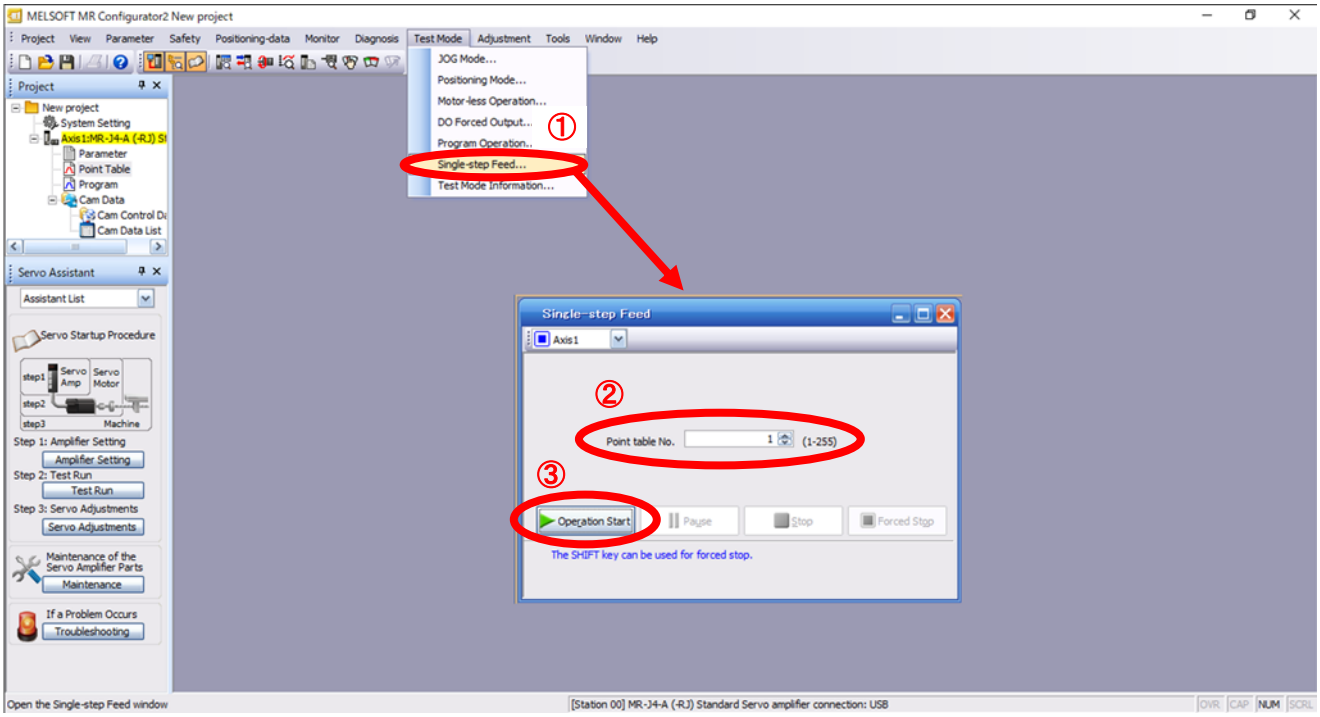
When checking the operation of the set point table, test operation specifying the point table is possible.

(1) Click "Test Mode" - "Single-step Feed" in the setup software to display the "Single-step Feed" window.
(When using this function, external input signal operation is disabled. When controlling from a PLC or host device, be sure to turn the power OFF and then ON again before using.)

(2) Enter the point table number to operate.

(3) Click the "Operation Start" button.
The actuator moves to the target position of the specified point table with the power -on position as the reference (0mm).

*If the target position and the actual movement position are different, review the PA21/PA06/PA07 parameters (Electronic gear ratio item -).



* Home position return cannot be performed in Test Mode.
Test operation is performed with the power-on position as the reference (0mm).
Therefore, even if the target position is set within the stroke range, depending on the position of the actuator, there is a possibility that it will touch the end edge, so please be careful when setting the target position.

5.8 Saving / Loading Parameters

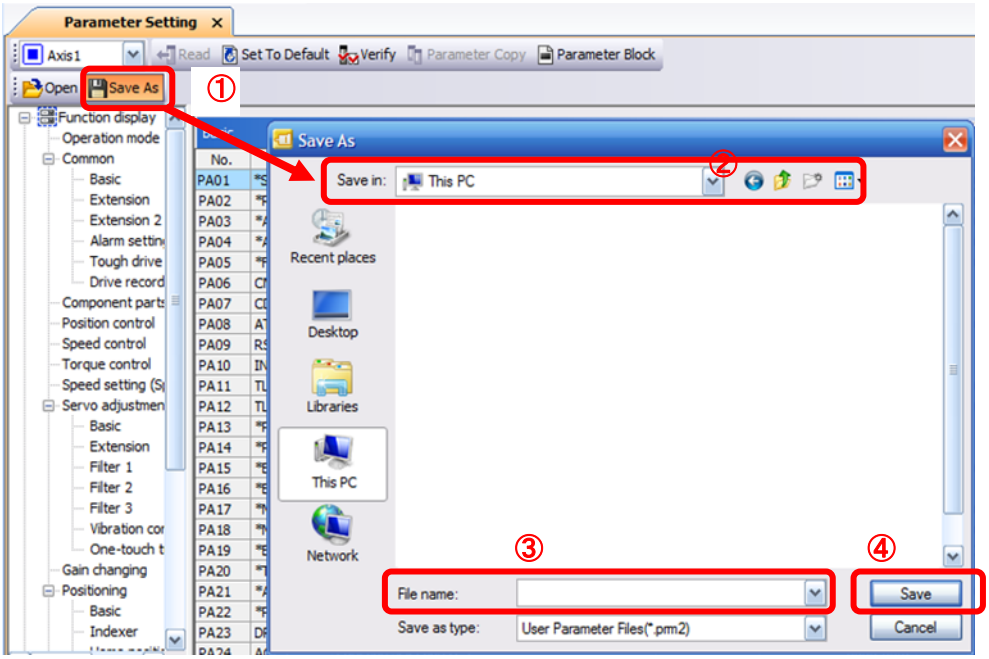
5.8.1 Saving Parameters

(1) Click “Save As” on the “Parameter Setting” window of the setup software to display the “Save As” window.
(2) Specify the save location.
(3) Enter an arbitrary parameter file name [.prm2].
(4) Click the “Save” button.

Save file

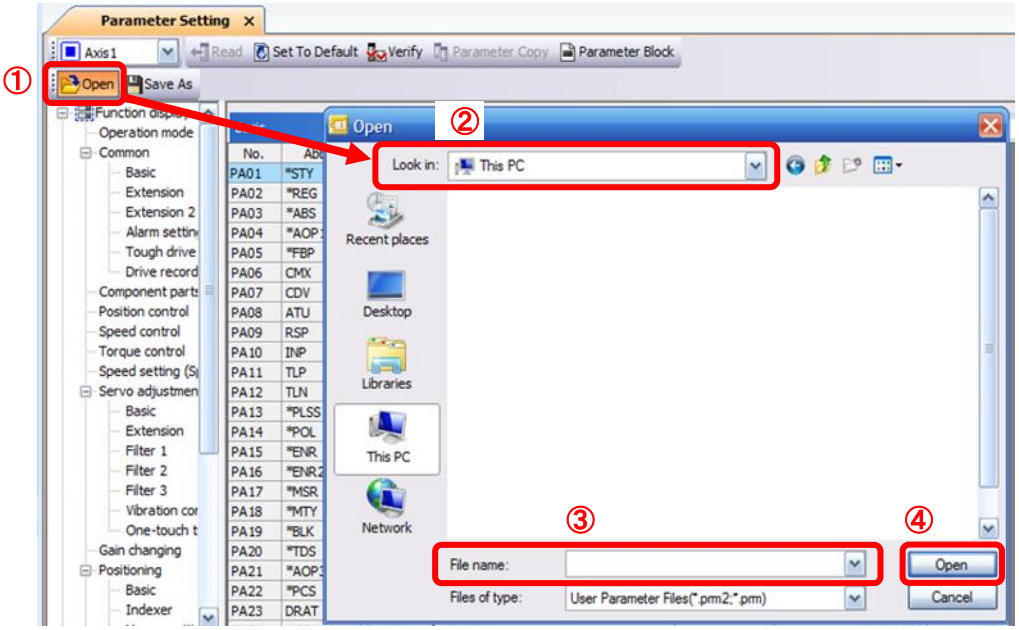
.prm2	PA, PB, PC, PD, PE, PF, PO, PS, PL, and PT each parameter setting files are saved.

* **Read the current parameters from the driver to the software before saving the parameters.**
(Refer to "LECSB2-T□ Operation Manual (Simplified Edition), section 5.3.2" for the reading parameters method.)



5.8.2 Loading Parameters

(1) Click "Open" on the "Parameter Setting" window of the setup software to display the "Open" window.
(2) Specify the file location.
(3) Select the parameter file name [.prm2] to be read.
(4) Click the “Open” button.
The parameters will be loaded.



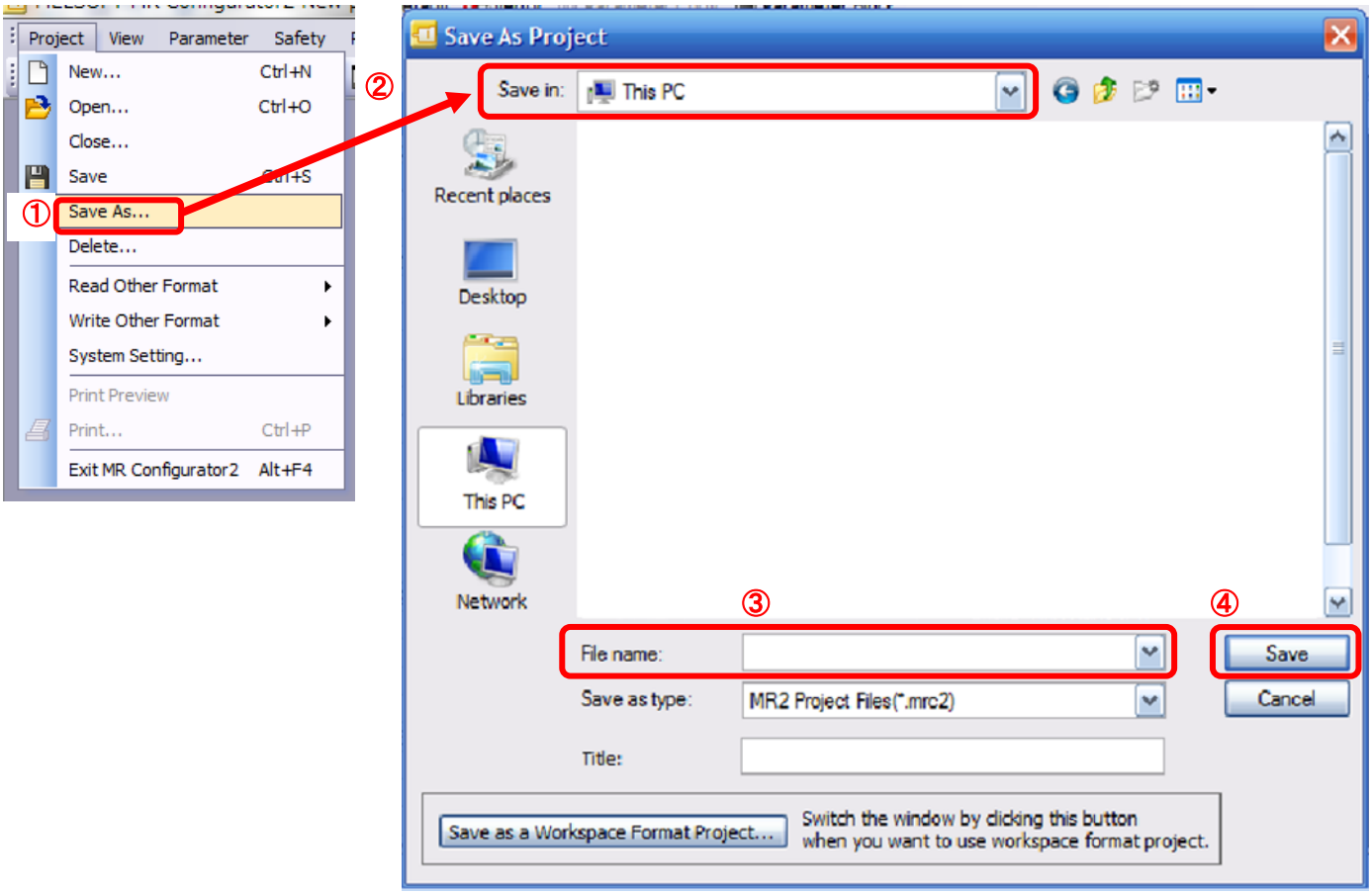
5.9 Saving / Loading Project

5.9.1 Saving Project

(1) Click "Project" - "Save As" in the setup software to display the "Save As Project" window.
(2) Specify the save location.
(3) Enter an arbitrary project file name [.mrc2].
(4) Click the “Save” button.
The project will be saved in the specified folder.

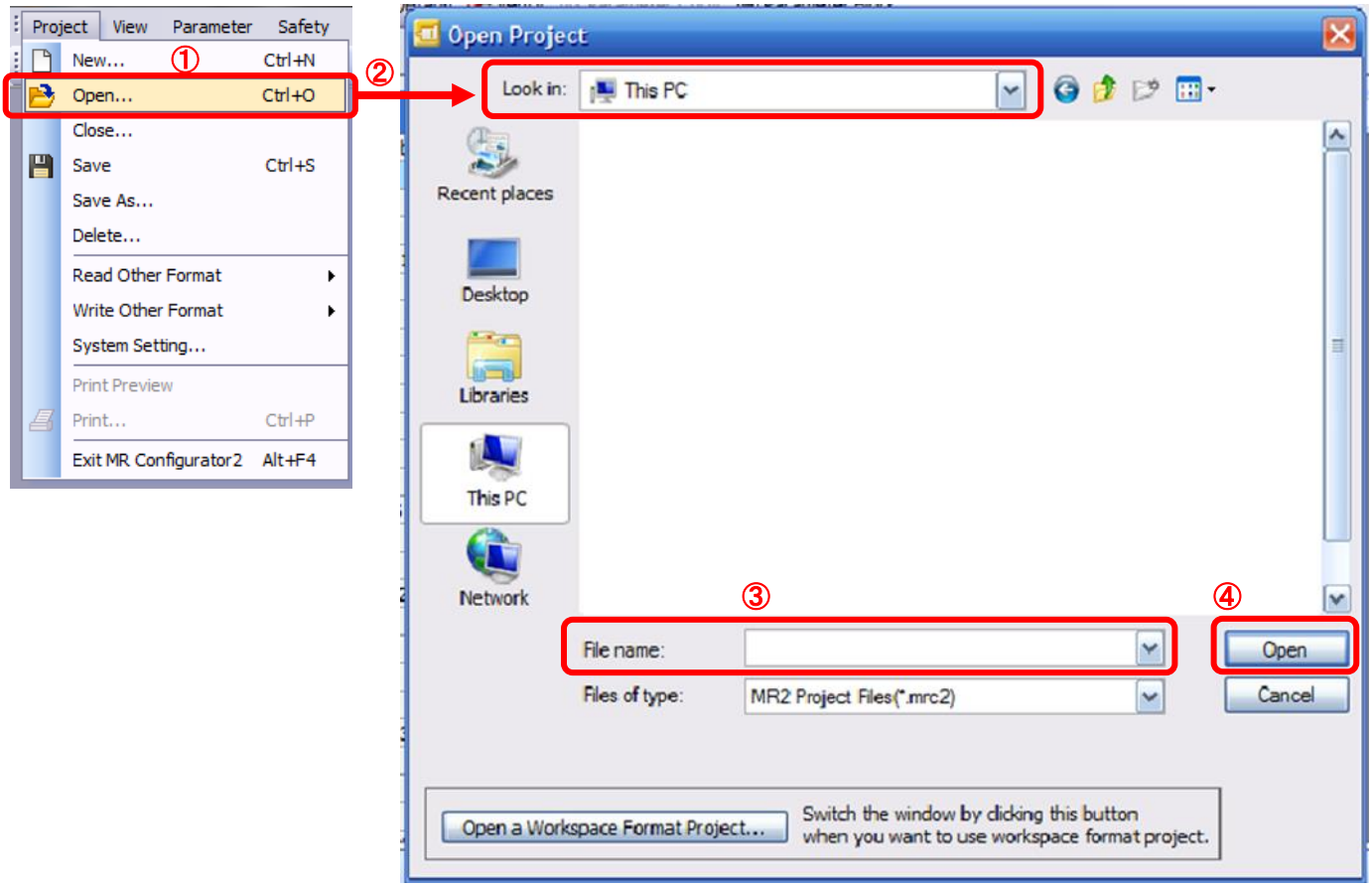
*** <u>Read the current parameters from the driver to the software before saving the project.</u>**
(Refer to "LECS B2-T □ Operation Manual (Simplified Edition), section 5.3.2" for reading parameters method.)

<u>Also, when saving the point table data in the project as well,</u>
<u>Update the point table data to the project before saving the project.</u>
(For the method of updating the point table data to the project,
Refer to "LECSB2-T□ Operation Manual (Simplified Edition)", section 5.7.1.)



5.9.2 Loading Project

(1) Click "Project" - "Open" in the setup software to display the "Open Project" window.
(2) Specify the file location.
(3) Select the project file name [.mrc2] to be read.
(4) Click the "Open" button.
The project will be loaded.

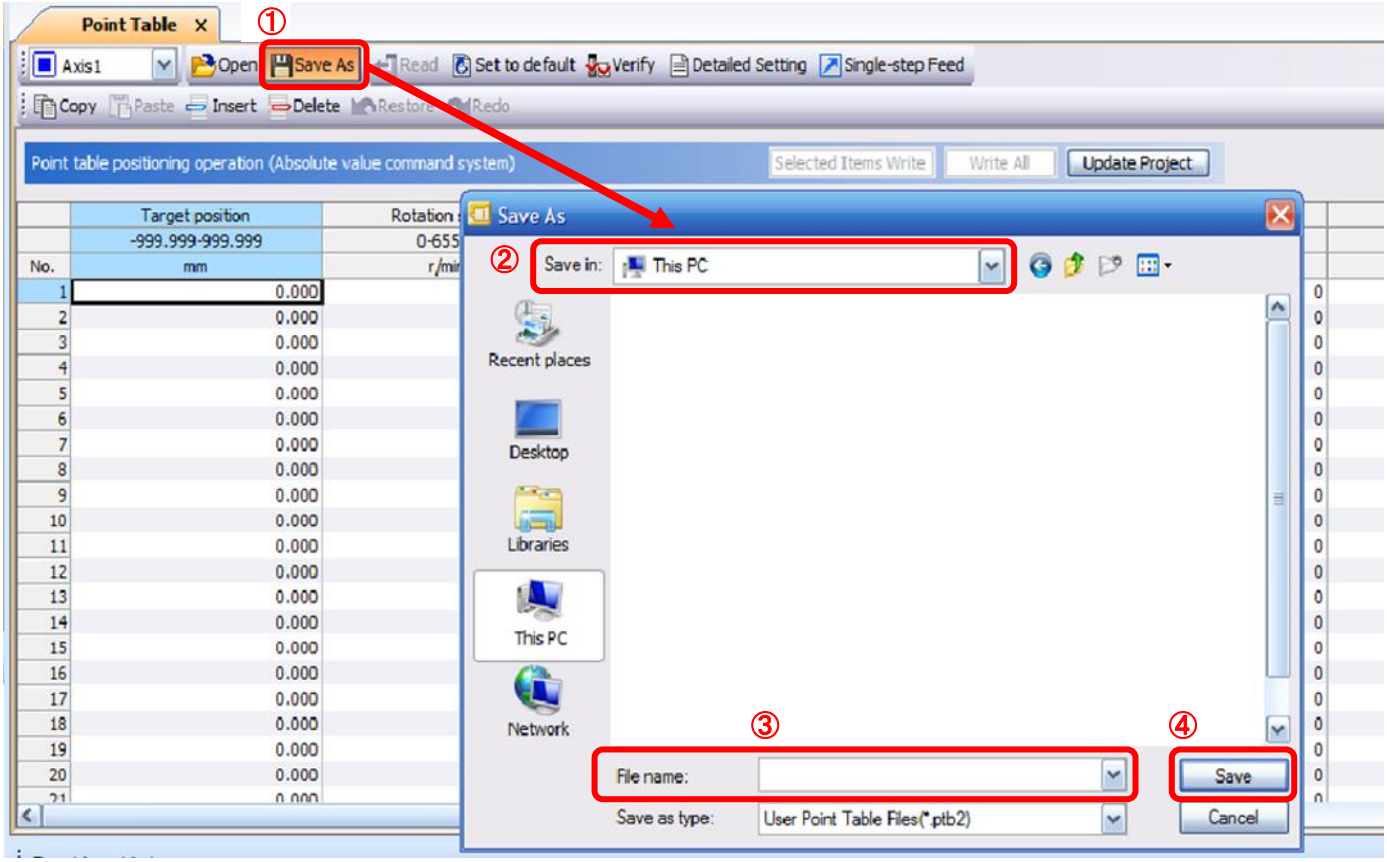


5.10 Saving / Loading Point Table

5.10.1 Saving Point Table

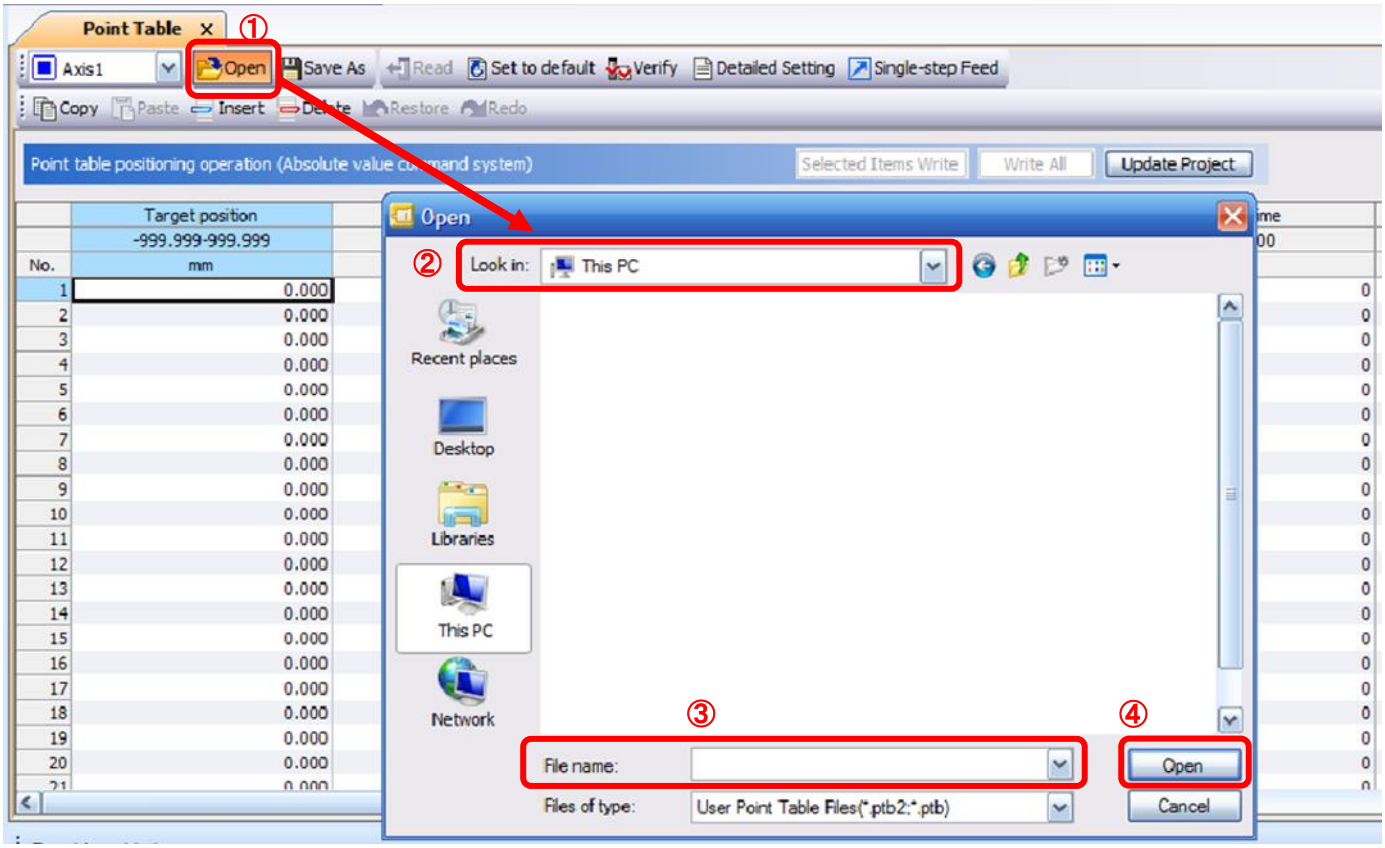
(1) Click "Save As" on the "Point Table" window of the setup software to display the "Save As" window.
(2) Specify the save location.
(3) Enter an arbitrary point table file name [.ptb2].
(4) Click the "Save" button.

***Save the point table data set in the driver,**
<u>Read the current point table from the driver to the software before saving the point table.</u>
(Refer to "LECS B2-T □ Operation Manual (Simplified Edition) , section 5.7.1 " for reading the point table method.)



5.10.2 Loading Point Table

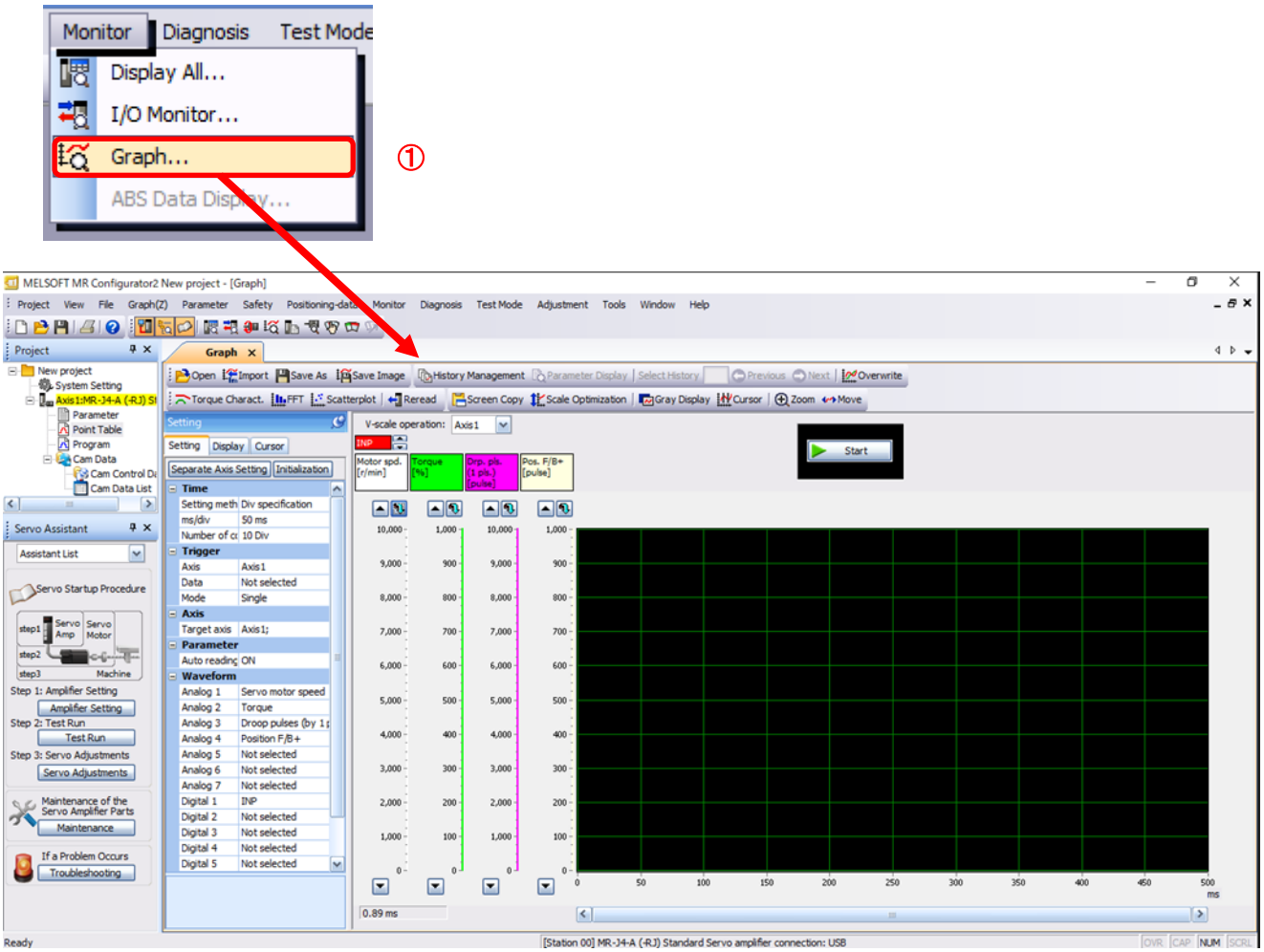
(1) Click "Open" on the "Point table" window of the setup software to display the "Open" window.
(2) Specify the file location.
(3) Select the point table file name [.ptb2] to be read.
(4) Click the "Open" button.
The point table will be loaded.



5.11 Acquisition of Motion Waveform by Graph Monitor

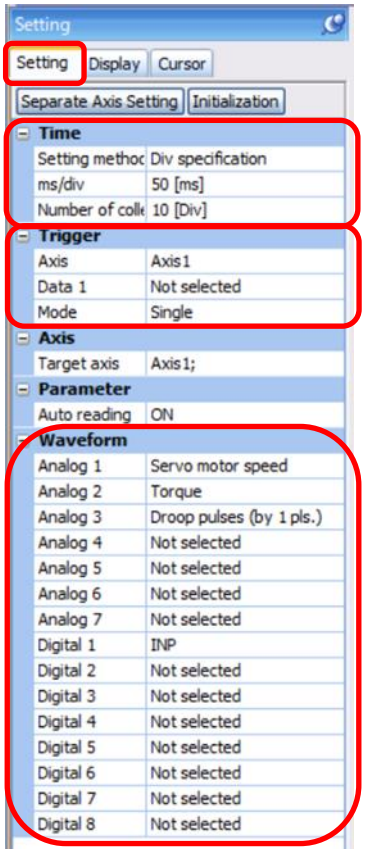
By the graph monitor function in the setup software, he motion waveform during electric actuator operation can be obtained as described below.

(1) Click "Monitor" - "Graph" in the setup software to display the "Graph" window.



5.11.1 Setting Items to display Graph

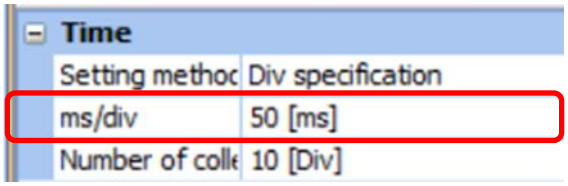
Set the items for displaying analog and digital waveforms, the trigger conditions, and the time on the horizontal axis of the graph.
Click the "Setting" tab in the "Setting" window to set the waveform display items, trigger conditions, and graph horizontal axis.
Seven types of analog waveforms (Analog 1 ~ Analog 7) and eight types of digital waveforms (Digital 1 ~ Digital 8) can be set.

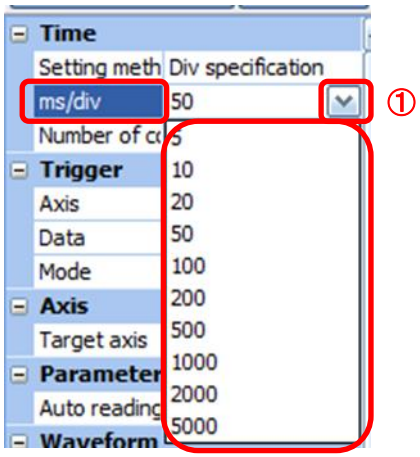


(1) Time

Set the width of the horizontal axis (Time axis) of the graph.
For the LECSB2-T, set the width of the horizontal axis (time axis) to the "Measurement time".

(1) Click " " of "Measurement time" to set the Measurement time.
The unit ms of "Measurement time" is 1000ms＝1s.

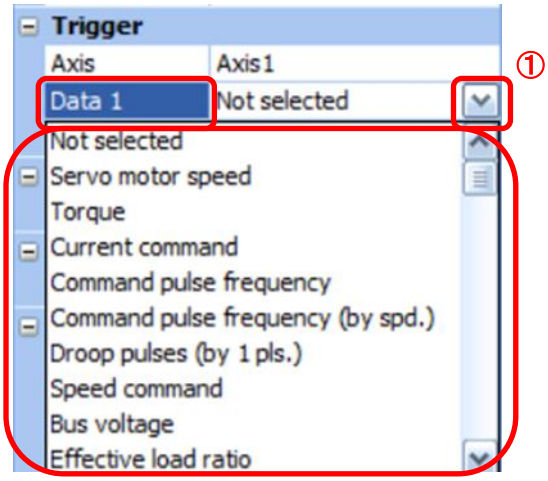




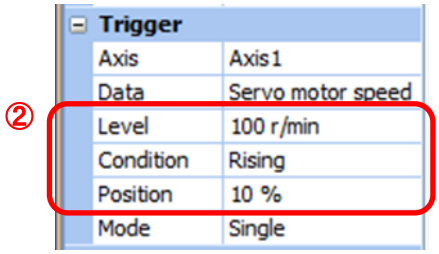
(2) Trigger

A "trigger" is a condition that determines when to display a graph. If the trigger conditions are not met, the waveform will not be displayed.

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



(2) "Level" / "Condition" / "Position" will be displayed.
Click " ▼ " of "Level" / "Condition" to set the condition.



In the case of motor speed, the "Level" has a sign, so it is necessary to change the setting according to the movement direction. Also, match the "Coondition".

"Level" / "Condition" setting (For motor speed)

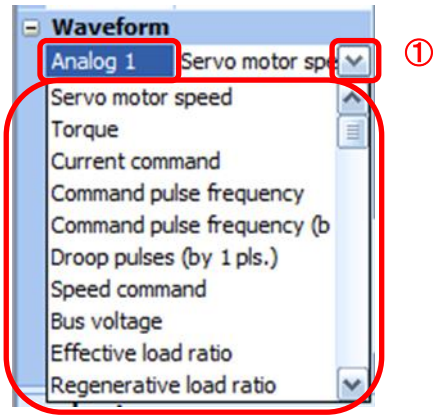
Operating direction	"Level" [r/min]	"Condition"
Positive direction action	100	Rising
Negative direction operation	-100	Falling

Set the "Position" to 10%.

(3) Waveform

Set the waveform data to display the graph.

Click “ ▼ “ of each “Analog” or “Digital” and set the type of waveform to be displayed.



The main analog waveforms and digital waveforms that can be set with the LECSB2-T are as follows.

■ Analog waveform

No.	Name	Function	Unit	Note
1	Motor speed	Display the rotation speed of the servo motor.	1 r/min	
2	Torque	Display the torque of the servo motor.	0.1%	
3	Current command	Display the current command given to the servo motor.	0.1%	
4	Command pulse frequency	Display the command pulse frequency.	1.125 kpulse /s	
5	Command pulse frequency (Speed unit)	The command pulse frequency is converted into the unit of rotation speed of the servo motor and displayed.	1 r/min	
6	Droop pulse (1 pulse unit)	Display the droop pulse of the deviation counter in units of 1 pulse. (Note) The portion exceeding the display range (-32768pulse to 32767pulse) is clamped and displayed in red.	1 pulse	
7	Speed command	Display the speed command given to the servo motor.	1 r/min	
8	Bus voltage	Display the bus voltage of the converter section of the driver.	1V	
9	Effective load ratio	Display the continuous effective load torque. Display the effective value for the past 15 seconds.	0.1%	
10	Regenerative load ratio	Display the ratio of regenerative power to allowable regenerative power in %.	0.1%	

■ Digital waveform

SON, LSP, LSN, TL1, PC, RES, CR, SP1, SP2, SP3, ST1, ST2, LOP, EM1, MD0, DOG, TSTP, CDP, PI1, DI0, DI1, DI2, RS1, RS2, RD, SA, ZSP, TLC, VLC, INP, WNG, ALM, OP, MBR, CPO, ZP, POT, PUS, CDPS, IPF, MEND, MTTR, PT0, PT1, PT2, OUT1, SOUT

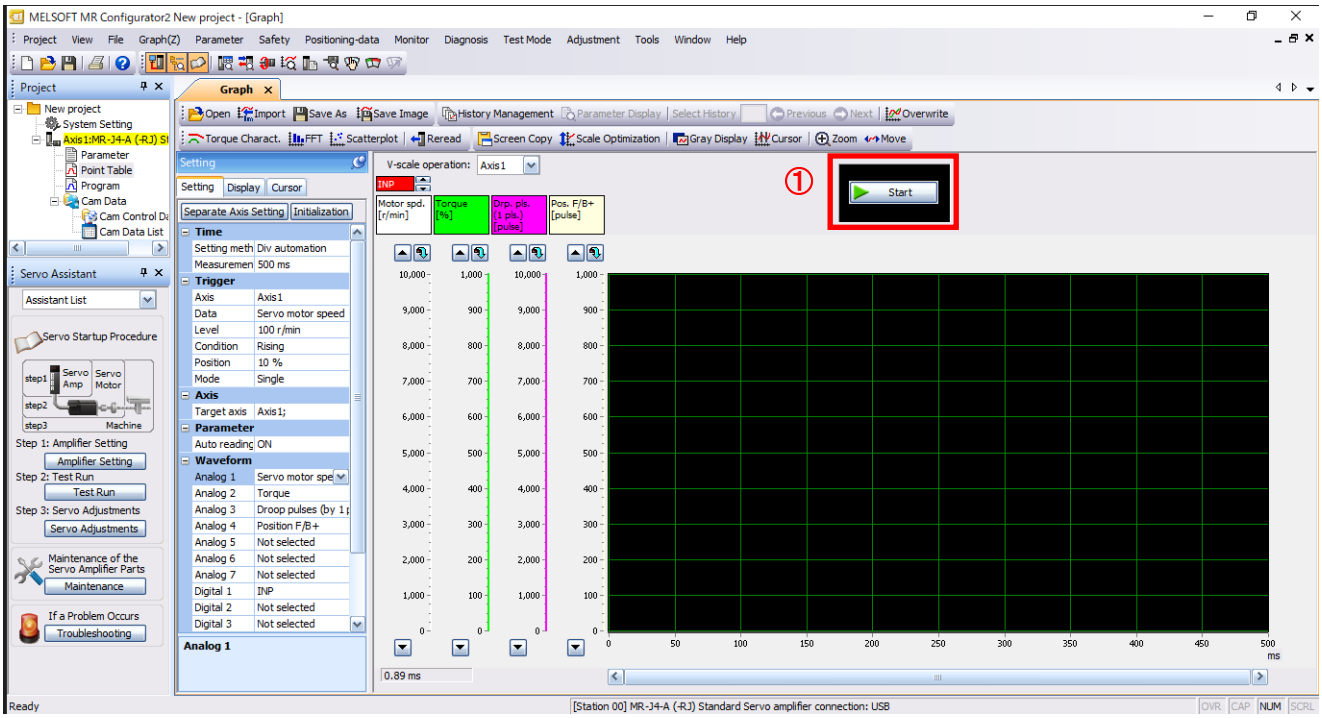
For details of each digital waveform, refer to "LECSB2-T □ Operation Manual, Chapter 3.5, Chapter 16.2.3, Chapter 17.4".

For details on available analog and digital waveforms, refer to the table of contents in the help function of MR Configurator2.
Refer to the item "Servo amplifier/module detailed information list" - "MR-J4-A detailed information" - "Monitor list" - “Analog signal/Digital signal list”.
(For how to use the help function, refer to " LECSB2-T Operation Manual (Simplified Edition), section 5.2.5".)

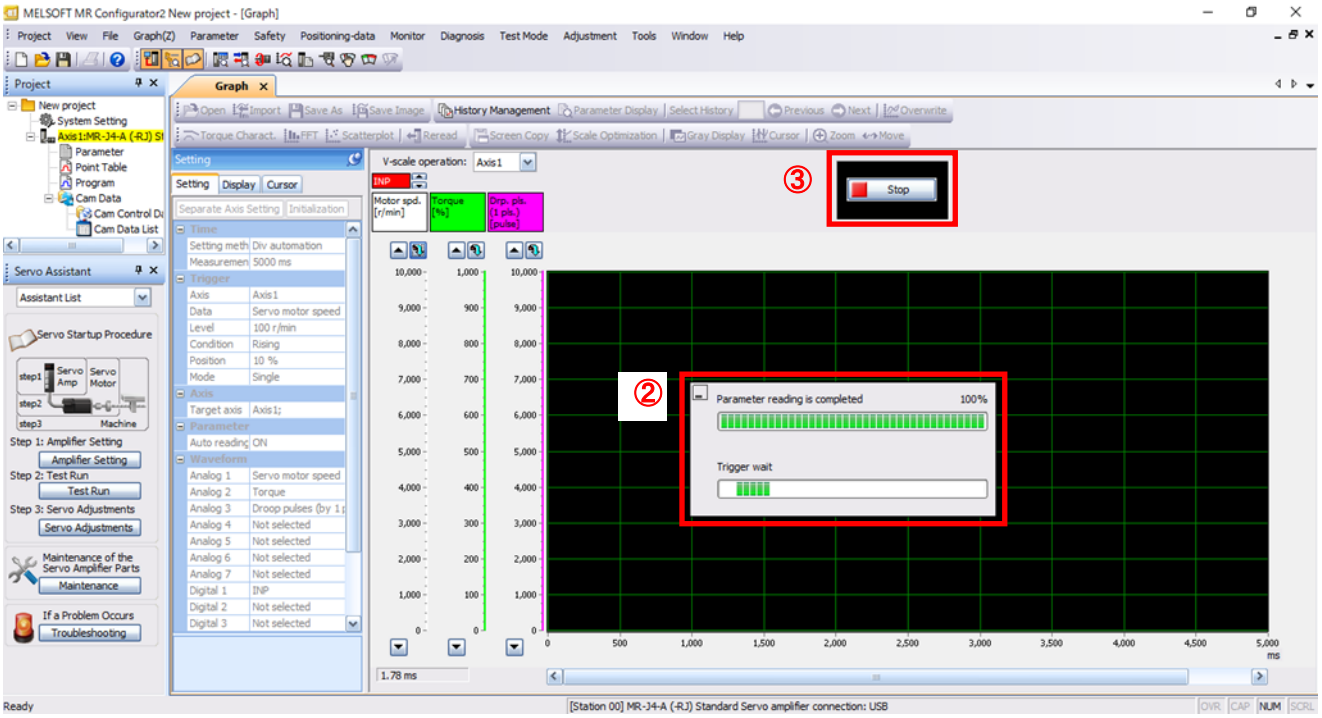
5.11.2 Trigger Wait

Click the "Start" button to enter the trigger wait state. If the trigger conditions are met in this trigger waiting state, the waveform is acquired and displayed. Also, in the case of single-shot setting, the next measurement cannot be performed unless the "Start" button is clicked after each measurement. (It also has the advantage that the waveform will not be updated even if it is operated by mistake.)

(1) Click the "Start" button.



(2) It will be in trigger wait state.
(3) Click the "Stop" button to stop acquiring waveform.

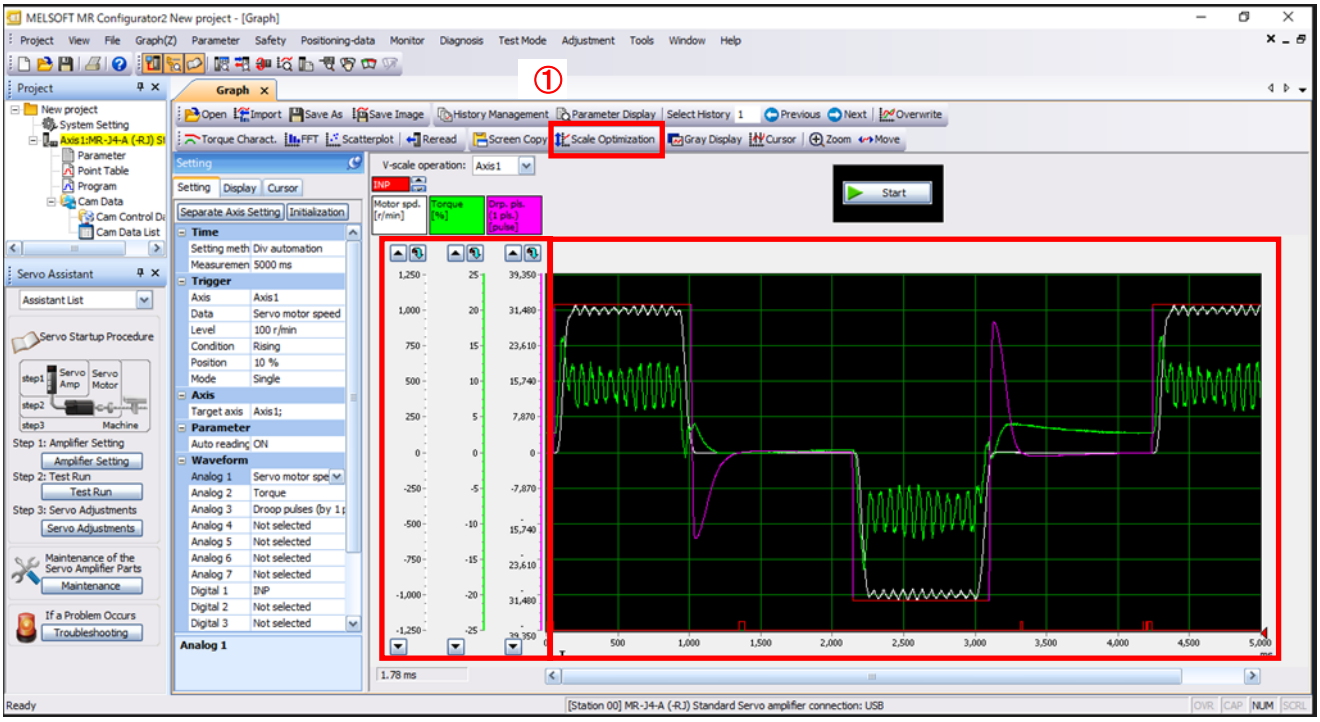


5.11.3 Operation Instruction

A drive instruction is issued from the host side PLC, etc. to operate the actuator.
Operation waveform acquisition starts when the trigger conditions in 5.11.1 (2) are met.

When the time set in 5.11.1 (1) has elapsed from the start of acquisition, waveform acquisition will be end and the waveform will be displayed on the window.

(1) Click the "Scale Optimization " button to automatically adjust the range of the vertical axis.



5.11.4 Saving Waveform

After the waveform is displayed, save the data in three ways.

(1) Click the "Save As" button.
Specify the file name to save and save. A waveform data file (Extension gpf2) is created.
When checking the waveform status again, it can be displayed in the graph window.

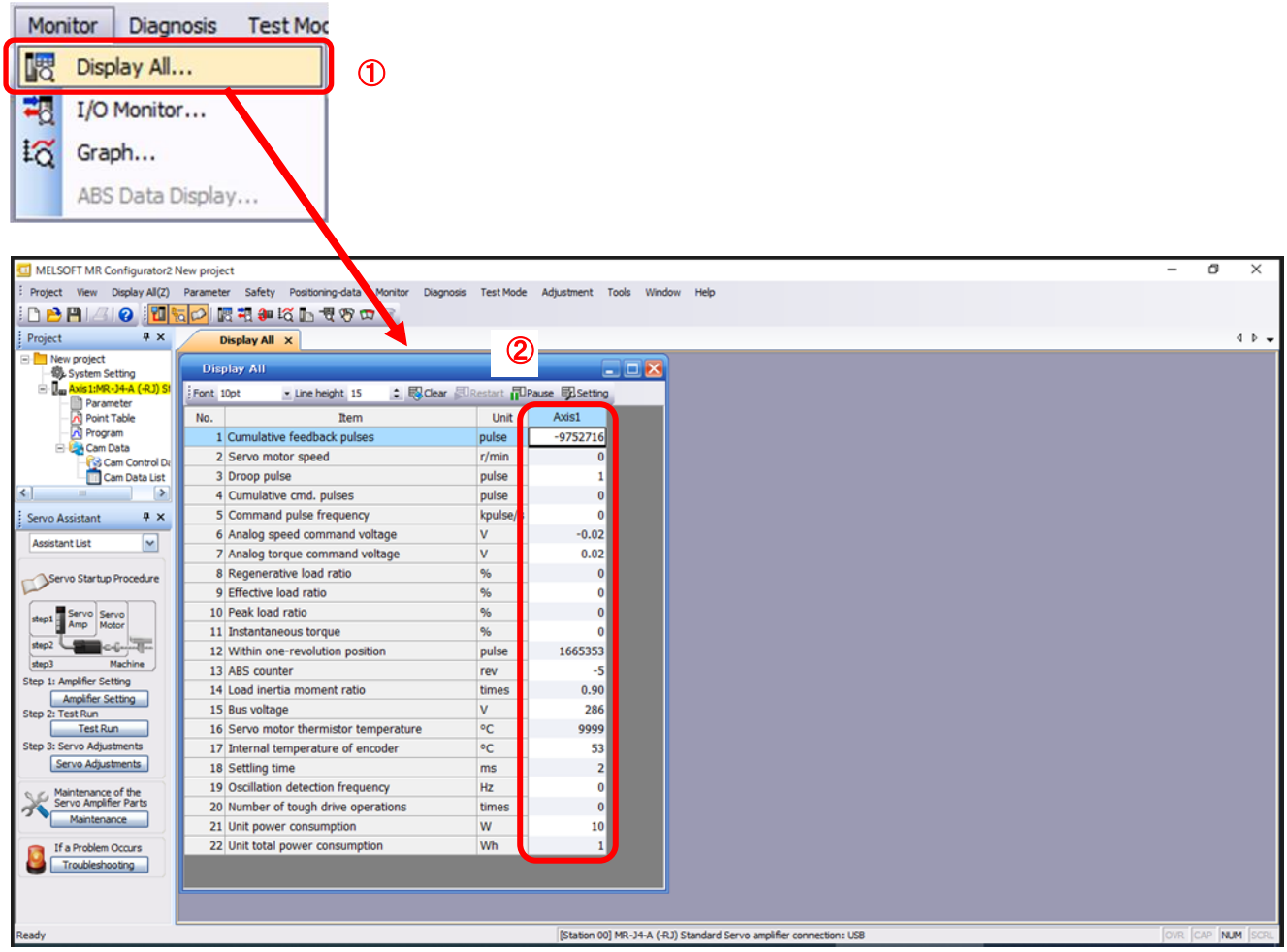
(2) Click the "Save Image" button.
Specify the file name to save and save. An image file (Extension jpg) is created.

(3) Click the "Screen Copy" button.
Saves (print screen) the displayed waveform window.

5.12 Display All Monitor List

How to acquire the electric actuator status using the batch display function of the setup software is showing.

(1) Click "Monitor" - "Display All" in the setup software to display the "Display All" window.
(2) The status of each item will be displayed.
If the setup software is offline, "----" will be displayed.



For the contents displayed by LECSB2-T, from the table of contents in the help function of MR Configurator2, refer to the item of "Servo amplifier/module detailed information list" - "MR-J4-A detailed information" – "Monitor list"- “For standard control mode”.
(For how to use the help function, refer to " LECSB2-T Operation Manual (Simplified Edition), section 5.2.5".)

6. Home Position Return Method

6.1 Position Control Mode (Pulse Input)

When using the home position return in position control mode (Pulse input), use the home position return function in the positioning unit of the PLC on the host side.
Refer to the Operation Manual of the device used for the wiring, and setting of parameters, etc. of the positioning unit, and the handling and details of the device such as the home position return method.

6.2 Positioning mode (Point table)

In the positioning mode (Point table), the driver has the home position return function.
There are 11 types of home position return as follows.
Refer to "LECSB2-T □ Operation Manual, section 16.7" for details of home position return.

Method	How to Home Position Return	Features
Dog Type	Deceleration starts at the front end of the proximity dog, and the first Z-phase signal after passing the rear end or the position moved by the home position shift amount from the Z-phase signal becomes the home position.	・This is a general home position return method using a proximity dog. ・Repeatability of home position return is improved. ・Less strain on the machine. ・This is used when the width of the proximity dog can be set larger than the deceleration distance of the servo motor.
Count Type	Deceleration starts at the front end of the proximity dog, and the first Z-phase signal after moving the movement amount after passing or the position after moving the home position shift amount from the Z-phase signal becomes the home position.	・This is the home position return method using a proximity dog. ・It is used when making the length of the near-point dog as short as possible.
Dataset Type	Set an arbitrary position as the home position.	・Proximity dog is unnecessary.
Pushsing Type	Push against the stopper on the machine and set the stopped position as the home position.	・The home position return speed must be sufficiently low so that it collides with the machine's stopper. ・It is necessary to increase the strength of the machine and stopper.
Home Position Ignore (Servo-ON Position Home)	The home position is the position when the servo is turned on.	
Dog Type Rear End Reference	Deceleration is started at the front end of the proximity dog, and after passing the rear end, the home position is the position where the movement amount after the proximity dog and the home position shift amount have been moved.	・Z-phase signal is not required.
Count Type Front End Reference	Deceleration starts at the front end of the proximity dog, and the position after moving the proximity dog movement amount and home position shift amount is set as the home position.	・Z-phase signal is not required.
Dog Cradle Type	The first Z-phase signal after detecting the front end of the proximity dog is used as home position.	
Dog Type Immediately before Z phase Reference	After detecting the front end of the proximity dog, it moves in the opposite direction, and the first Z-phase signal after separating from the proximity dog or the position shifted by the home position shift amount from the Z-phase signal becomes the home position.	
Dog Type Front End Reference	The position after moving the amount after the proximity dog and the home position shift amount from the front end of the proximity dog becomes the home position.	・Z-phase signal is not required.
Dogless Z-phase Reference	The home position is set to the position shifted by the home position shift amount from the first Z-phase signal or Z-phase signal.	

Note: The Z -phase signal is a signal that is recognized within the driver once per servomotor rotation.

When performing Home position return, set parameter No.PT04 (Home Position Return Type).
Parameters recommended in " LECSB2-T □ Operation Manual Appendix 11 " are the push type (PT04: □□□3).
Please select the most suitable Home position return method according to your company's specifications.

[Pr. PT04]

0	0	0	

Home position return method
0: Dog Type (Rear end detection Z phase reference)
1: Count Type (Front end detection Z phase reference)
2: Data set Type
3: Pushing Type
4: Home Position Ignore (Servo on position Home)
5: Dog Type (Rear end detection Rear end reference)
6: Count Type (Front end detection Front end reference)
7: Dog Cradle Type
8: Dog Type (Front end detection Z phase reference)
9: Dog Type (Front end detection Front end reference)
A: Dogless Type (Z phase reference)

Set the home position return direction.
Parameter recommended in "LECSB2-T □ Operation Manual Appendix 11 " is the home position return direction (PT04: 00□ 3).

[Pr. PT04]

0	0		0

Home position return direction
0: Address increasing direction
1: Address decrease direction

When using DOG (Proximity dog), set the detecting the proximity dog with the polarity selection (PT29: 000□).
For pushing type home position return, PT29 does not need to be changed.

[Pr. PT29]

0	0	0	

DOG (Proximity dog) Polarity selection
0: Dog detected when OFF
1: Dog detected when ON

6.2.1 Pushing Type Home Position Return Method

In the pushing type home position return, the position is used as the home position by returning to the home position while being pressed against a stopper or the like.

While maintaining the pushing home position return (Pressed state) for a certain period of time (Parameter recommended value PT11 (Pushing type home position return 24% of the torque limit value), an overload alarm (AL50,AL51) occurs. In that case, after the completion of the pushing home position return, move to any position (Unpressed position) from the pushing position.

(1) Devices and parameters

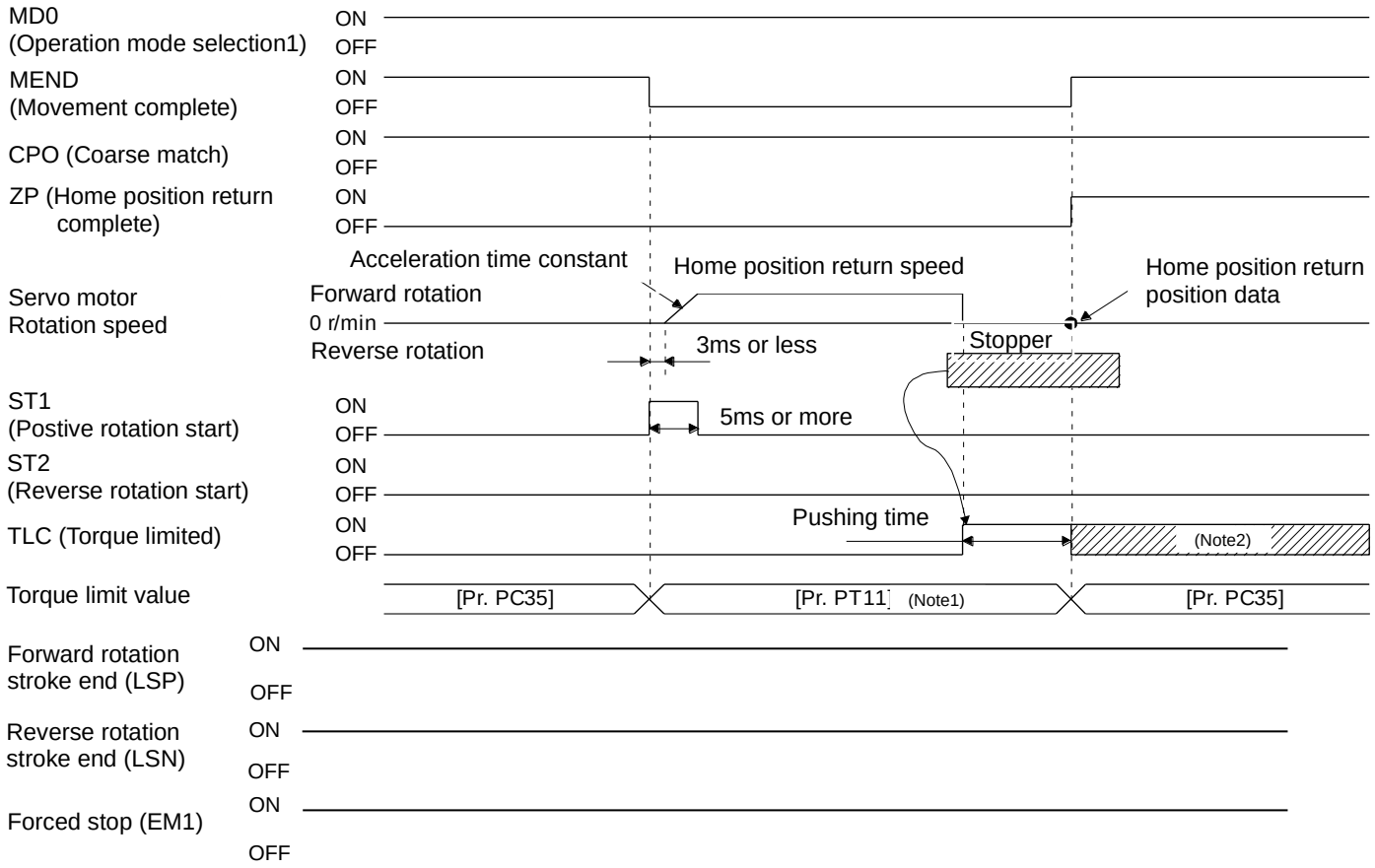
Set the input device and parameters as follows.

Item	Devices / Parameters used	Settings
Home position return mode selection	MD0 (Operating mode selection 1)	Turn on MD0.
	DI0 (Point table number selection 1) ~ DI7 (Point table number selection 8)	Turn off DI0 ~ DI7.
Pushing type home position return	[Pr.PT04]	_ _ _ 3: Select the pushing type.
Home position return direction	[Pr.PT04]	Select the home position return direction.
Home position return speed	[Pr.PT05]	Set the rotation speed until it hits the stopper.
Pushing time	[Pr.PT10]	Set the time from hitting the stopper to acquiring the home position data and outputting ZP (home position return complete).
Pushing type home position return torque limit value	[Pr.PT11]	Set the servo motor torque limit value for execution of pushing type home position return.
Acceleration time constant for home position return	Point table number 1	Use the acceleration time constant of point table number 1.
Home position return position data	[Pr.PT08]	Set the current position when Home position return is completed.

* To set [PT**], set parameter write protection [PA19] to "00AB".

Refer to LECSB-T□ Operation Manual Appendix 11 " for the recommended parameter values for each actuator.

(2) Timing chart



Note1 The torque limits that become effective here are as follows.

Input device (0: off, 1: on)		Limit state			Effective torque limit value
TL1	TL				
0	0				Pr.PT11
0	1	TLA	>	Pr.PT11	Pr.PT11
		TLA	<	Pr.PT11	TLA
1	0	Pr.PC35	>	Pr.PT11	Pr.PT11
		Pr.PC35	<	Pr.PT11	Pr.PC35
1	1	TLA	>	Pr.PT11	Pr.PT11
		TLA	<	Pr.PT11	TLA

Note2 It turns on when the torque set in [Pr. PA11 Forward rotation torque limit], [Pr. PA12 Reverse rotation torque limit] or [Pr. PC35 Internal torque limit 2] is reached.

The set value of [Pr. PT08 Home position return position data] becomes the position address when the home position return is completed.

7. Operation Method of each Mode

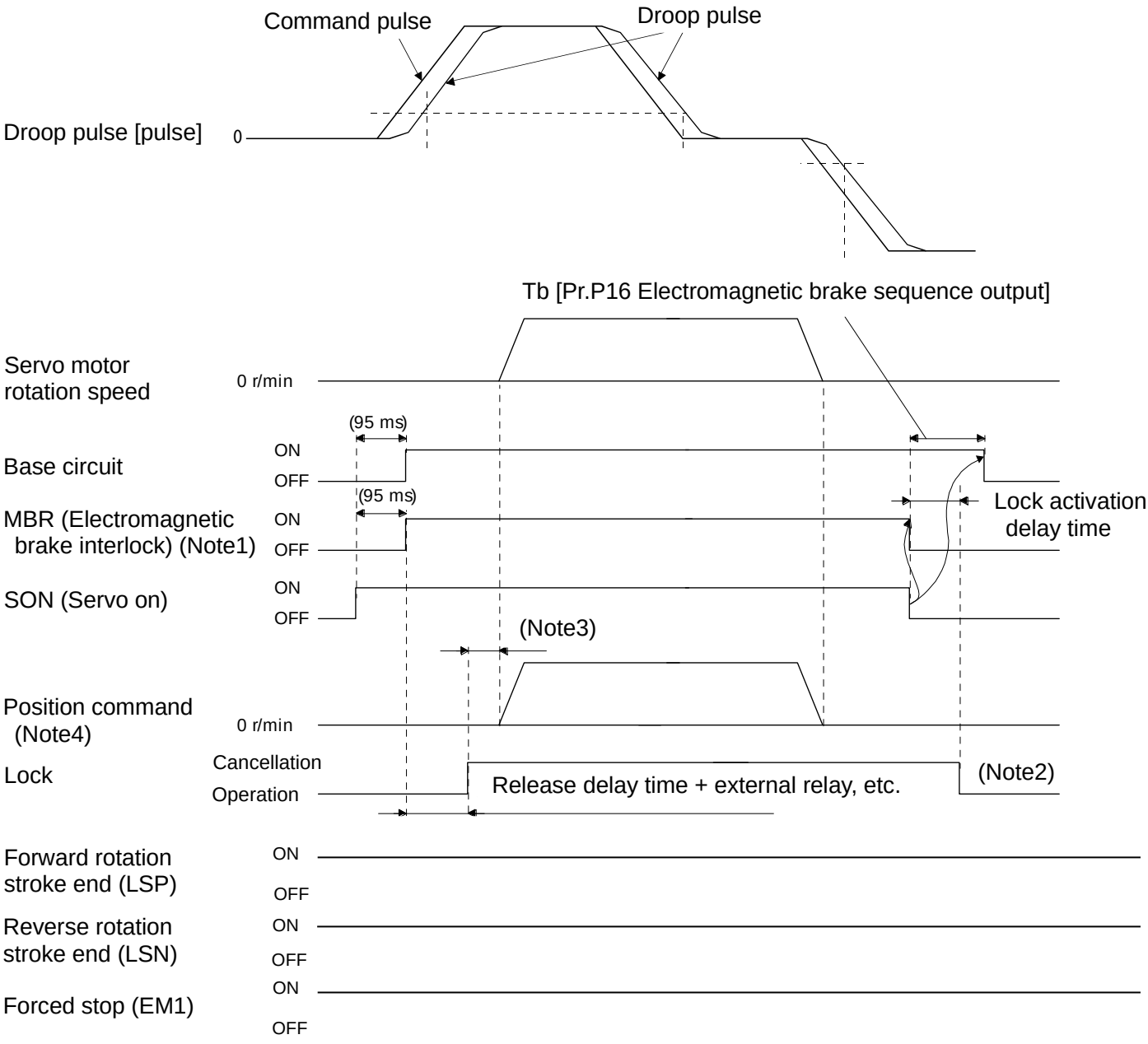
7.1 Position Control Mode (Pulse Input)

Positioning is performed by controlling the speed, acceleration / deceleration, direction, etc. of the motor with a pulse train.

7.1.1 Operating Instruction

Command pulses (speed, acceleration / deceleration, direction, etc.) are input from the positioning unit to the driver, and the driver operates the actuator according to the command pulses.
Set the speed and acceleration / deceleration within the specification range of each actuator.
For speed and acceleration / deceleration specification, refer to the catalogs and manuals of each actuator.

Command pulses and operation examples are shown below.



Note 1 ON: Lock is not working
OFF: Locked state

2. The lock is released with a delay of the unlock delay time and the operating time of the external circuit relay.
3. Perform the position command after the lock is released.
4. This is for position control mode.

7.2 Speed Control Mode

Smoothly control the rotation speed and direction of the servo motor with high accuracy.
LECSB2-T can perform analog speed command.

7.2.1 Operating Instruction

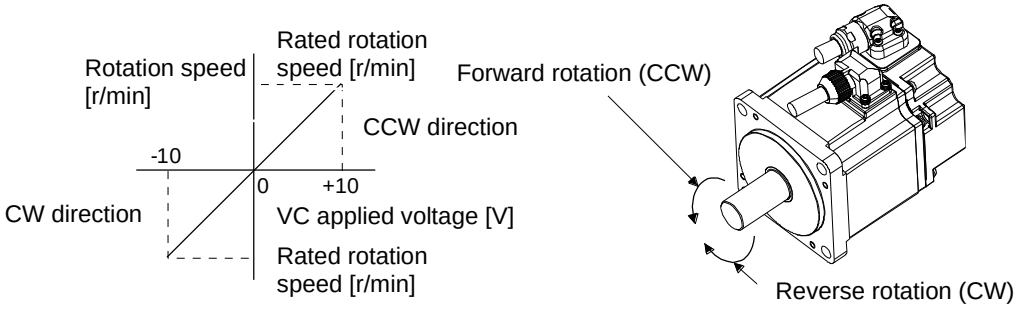
The servo motor rotates when the ST1 and ST2 signals are turned ON.
An operation example of the speed control mode is shown below.

Speed setting

Speed command and rotation speed

Operates at the rotation speed set by the parameter or the rotation speed set by the applied voltage of VC (Analog speed command). The relationship between the applied voltage of VC (Analog speed command) and the servo motor rotation speed is shown below.

In the initial setting, ±10 V is the rated rotation speed. Note that the rotation speed when ±10 V can be changed with [Pr. PC12].



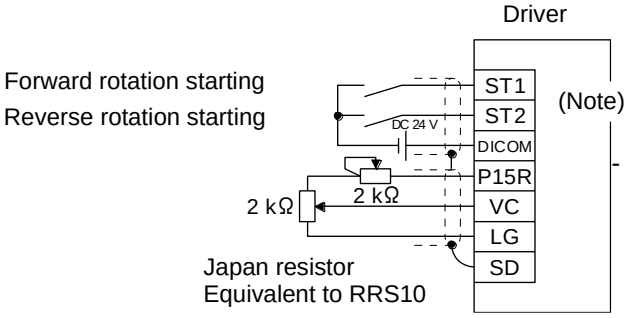
The direction of rotation for ST1 (forward rotation start) and ST2 (reverse rotation start) is shown as following table.

(Note1) Input device		(Note2) Direction of rotation			
ST2	ST1	VC (Analog speed command)			Internal speed command
		+ Polarity	0 V	-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 released while the servo is locked, the servo motor may rotate rapidly depending on the amount of positional deviation from the command position.

In general, connect as follows.



Note. This is for the sink I/O interface.

For signal assignment, refer to "LECSB2-T □ Operation Manual, section 3.2.2".

LECSB 2-T Speed Command Parameter Setting

(Note) Input device			Speed command	
SP3	SP2	SP1		
0	0	0	Analog speed command (VC)	Initial
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 LECSB2-T, Analog speed command and 7 patterns of Speed setting are available.
The default signal assignments are SP1 and SP2.
When using up to "Internal speed command 7", assign speed selection 3 (SP3).

Refer to "LECSB2-T Operation Manual, section 3.6.2" for details of Analog speed command.

7.3 Torque Control Mode

Control servo motor output torque. It also has a speed limit function.
LECSB2-T can perform analog torque commands.

7.3.1 Operating Instruction

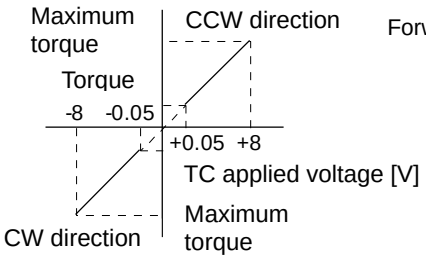
The servo motor rotates when the RS1 and RS2 signals are turned ON.
An operation example of the torque control mode is shown below.

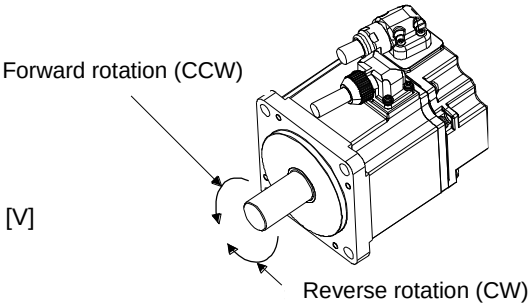
Torque control

Torque command and torque

The relationship between the applied voltage of TC (Analog torque command) and the torque of the servo motor is shown below.

± 8 V produces maximum torque. In addition, the torque at ± 8V input can be changed with [Pr. PC13].



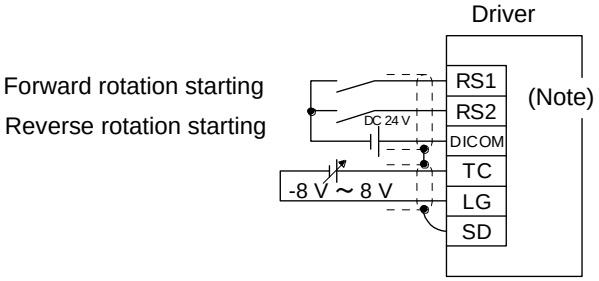


The output torque command value for voltage varies by approximately 5 % depending on the product.
Also, if the voltage is low (-0.05 V ~ 0.05 V) and the actual speed is close to the limit value, the torque may fluctuate. In such cases, increase the speed limit value.
The direction of torque generation by RS1 (Forward rotation selection) and RS2 (Reverse rotation selection) when using TC (Analog torque command) is shown as following table.

(Note) Input device		Direction of rotation		
RS2	RS1	TC (Analog torque command)		
		+ Polarity	0 V	-Polarity
0	0	Torque is not generated.	Does not generate torque.	Torque is not generated.
0	1	CCW (Forward rotation in Powering / Reverse rotation in Regenerating)		CW (Reverse rotation in Powering / Forward rotation Regenerating)
1	0	CW (Reverse rotation in Powering / Forward rotation Regenerating)		CCW (Forward rotation in Powering / Reverse rotation in Regenerating)
1	1	Torque is not generated.		Torque is not generated.

Note 0: OFF
1: ON

In general, connect as follows.



note. This is for the sink I/O interface.

For signal assignment, refer to "LECSB2-T Operation Manual, section 3.2.3".

7.4 Positioning Mode (Point Table)

Positioning operation is executed simply by setting the position data, rotation speed, acceleration/deceleration time constant, etc. in the point table. (A maximum of 255-point tables can be used.)
For the positioning mode (Point table) operation, refer to "LECS B2-T □ Operation Manual, section 16.4".

7.4.1 Operating Instruction of Point Table

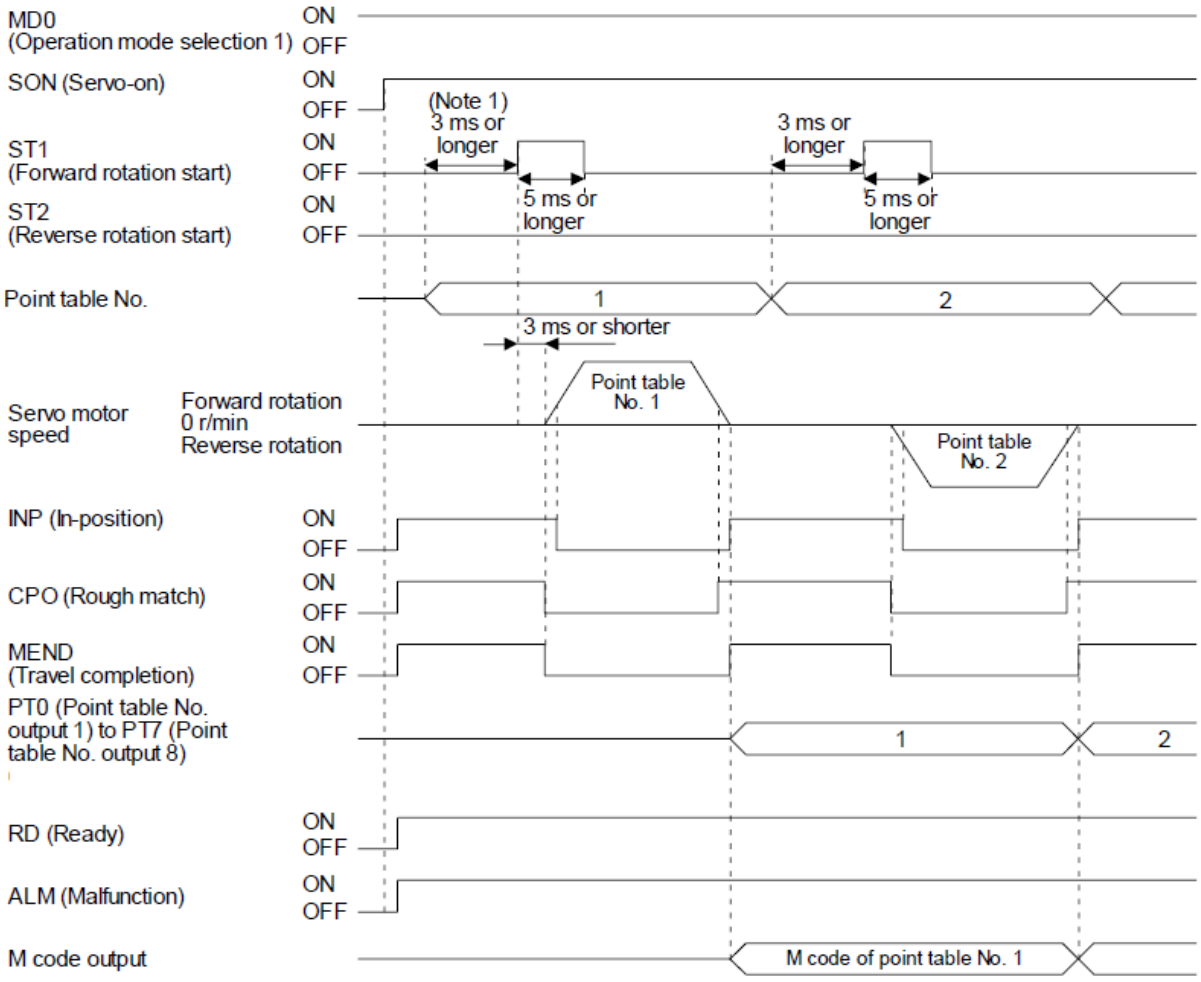
Select each point table number with DI0 ~ DI7 and start operation with ST1 or ST2.

<table>
<tr><th rowspan="2">Device Name</th><th rowspan="2">Symbol</th><th rowspan="2">Connector Pin Number</th><th rowspan="2">Function and Use</th><th rowspan="2">I/O class</th><th colspan="3">Control mode</th></tr>
<tr><th>CP</th><th>CL</th><th>PS</th></tr>
<tr><td>Point table number selection 1</td><td>DI0</td><td>CN1-19</td><td rowspan="10">In case of point table method
Select the point table and home position return mode using DI0 ~ DI7.

Device (Note) / Selection details
DI7 DI6 DI5 DI4 DI3 DI2 DI1 DI0
0 0 0 0 0 0 0 0 — Home position return mode
0 0 0 0 0 0 0 1 — Point table No.1
0 0 0 0 0 0 1 0 — Point table No.2
0 0 0 0 0 0 1 1 — Point table No.3
· · · · · · · · — ·
1 1 1 1 1 1 1 0 — Point table No.254
1 1 1 1 1 1 1 1 — Point table No.255

Note 0: OFF
1: ON</td><td rowspan="10">DI-1</td><td>○</td><td>○</td><td></td></tr>
<tr><td>Point table number selection 2</td><td>DI1</td><td>CN1-41</td><td>○</td><td>○</td><td></td></tr>
<tr><td>Point table number selection 3</td><td>DI2</td><td>CN1-10</td><td>○</td><td>○</td><td></td></tr>
<tr><td>Point table number selection 4</td><td>DI3</td><td>CN1-35</td><td>○</td><td>○</td><td></td></tr>
<tr><td>Point table number selection 5</td><td>DI4</td><td></td><td>△</td><td>△</td><td></td></tr>
<tr><td>Point table number selection 6</td><td>DI5</td><td></td><td>△</td><td>△</td><td></td></tr>
<tr><td>Point table number selection 7</td><td>DI6</td><td></td><td>△</td><td>△</td><td></td></tr>
<tr><td>number selection 8</td><td>DI7</td><td></td><td>△</td><td>△</td><td></td></tr>
</table>

When parameter "PT01: Command mode selection" is "0000: Absolute value command method".



Note 1. The detection of external input signals is delayed by the set time in the input filter setting of [Pr. PD29]. Considering the output signal sequence from the PC or PLC...etc and signal variations due to hardware, configure a sequence that changes the point table selection earlier.

*In positioning operation, if the command is position data (target position)≠0 and rotation speed = 0, the positioning operation command will not be accepted. In that case, clear the command remaining distance by turning MD0 (operation mode selection 1) from OFF to ON.

7.5 Positioning Mode (Programimg Method)

Position data, rotation speed, acceleration/deceleration time constant, etc. are created as a program, and the positioning operation is executed by executing the program. (A maximum of 256 programs with a total of 640 steps can be created.)

Setup software (MR Configurator2™: LEC-MRC2*) is always required to set program data in the programming method.

***1 Setup software 1.52E or higher is required.**

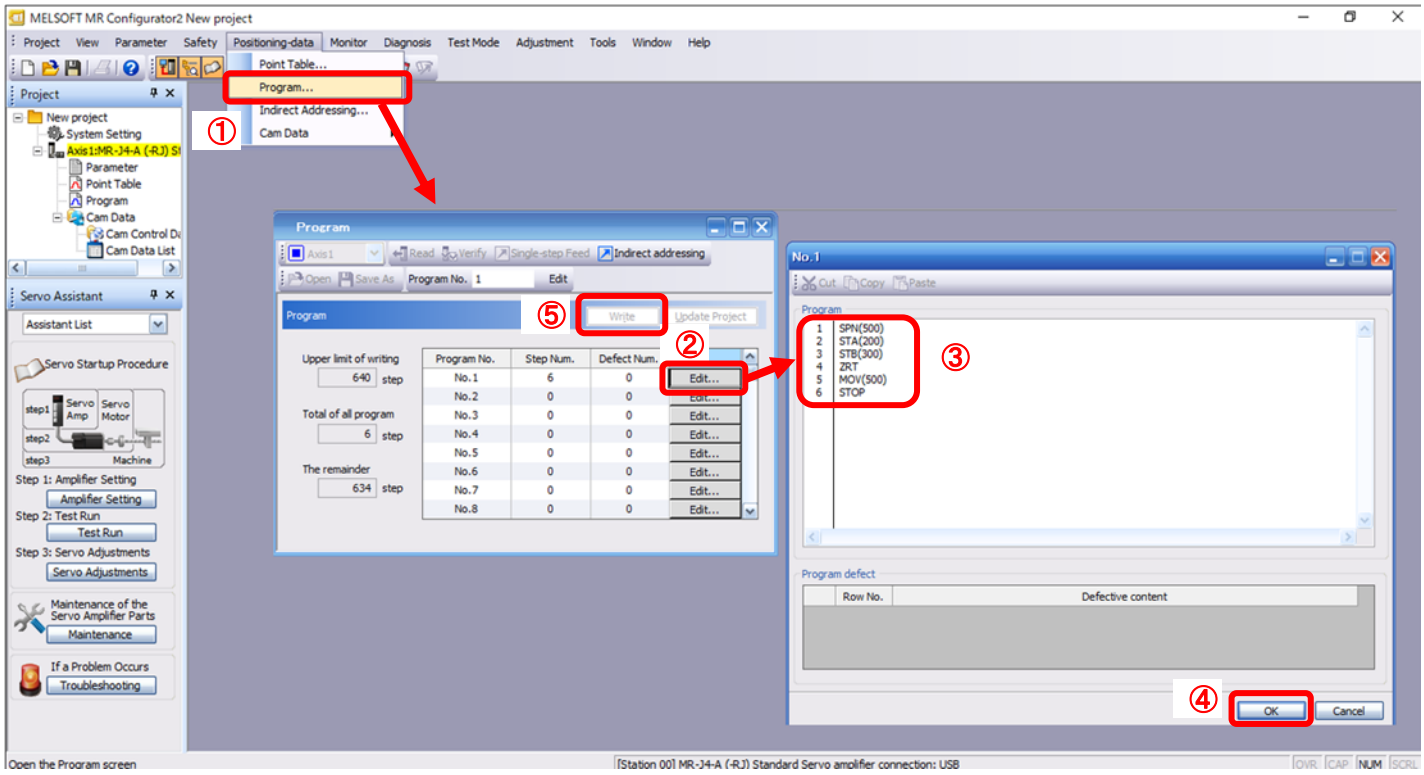
***2 Prepare the setup software (MR Configurator2™: LEC-MRC2*) separately.**

***3 Prepare the USB cable (LEC-MR-J3USB) separately.**

"LECSB2-T□ Operation Manual, section 16.10 " for positioning (programming method) mode operation.
For program setting, refer to "LECSB2-T□ Operation Manual 1, section 6.11 ".

7.5.1 How to Set

(1) Start the setup software and click "Program" in "Positioning-data".
(2) Click "Edit" in the program window to open the program edit window.
(3) Create a program.
(4) Click “OK” button.
(5) Program data is written to the driver with "Write" in the program window.



7.5.2 Commands in Program Method

An example of program commands is shown below.
For other program commands, refer to "LECSB2-T □ Operation Manual, section 16.11.2 ".

The maximum number of steps in a program is 640. Up to 256 programs can be created, but the total number of steps for each program is limited to 640.
The set program can be selected with DI0 (Program number selection 1) ~ DI7 (Program number selection 8).

(1) Command list Example

Command	Name	Setting	Setting range	Unit	Indirect specify	Content
SPN	Servomotor rotation speed	SPN (Setting value)	0 ~ allowable speed of each actuator	r/min	○	Set command rotation speed **(motor rotation speed per minute)** for positioning. Make sure that the set value is less than or equal to the allowable speed of each actuator used. If not set, it will run at 50 r/min.
STA	Acceleration time constant	STA (Setting value)	0 ~ 20000	ms	○	Set acceleration time constant. **Set time to reach the rated speed (3000 r/min).** It cannot be changed during command output. If not set, it will run at 1000 ms.
STB	Deceleration time constant	STB (Setting value)	0 ~ 20000	ms	○	Set deceleration time constant. **Set time from the rated rotation speed (3000 r/min to stop.** It cannot be changed during command output. If not set, it will run at 1000 ms.
MOV	Absolute value move command	MOV (setting value)	-999999 ~ 999999	× 10 ^{STM} μ m	○	Move set value as an absolute value. **The number of digits is changed by STM (Feed length magnification).**

7.5.3 Program-based Operation Instruction Method

Select DI0 (program number selection 1) ~ DI 7 (program number selection 8) and start operation with ST1.

Device name	Symbol	Connector pin number	Function and use	I/O Class	Control mode CP	CL	PS
Program Number selection 1	DI0	CN1-19	In case of program method Select the program number using DI0 ~ DI7.	DI-1	○	○	
Program Number selection 2	DI1	CN1-41			○	○	
Program Number selection 3	DI2	CN1-10			○	○	
Program Number selection 4	DI3	CN1-35			○	○	
Program Number selection 5	DI4				△	△	
Program Number selection 6	DI5				△	△	
Program Number selection 7	DI6				△	△	
Program Number selection 8	DI7				△	△	

Device (Note)

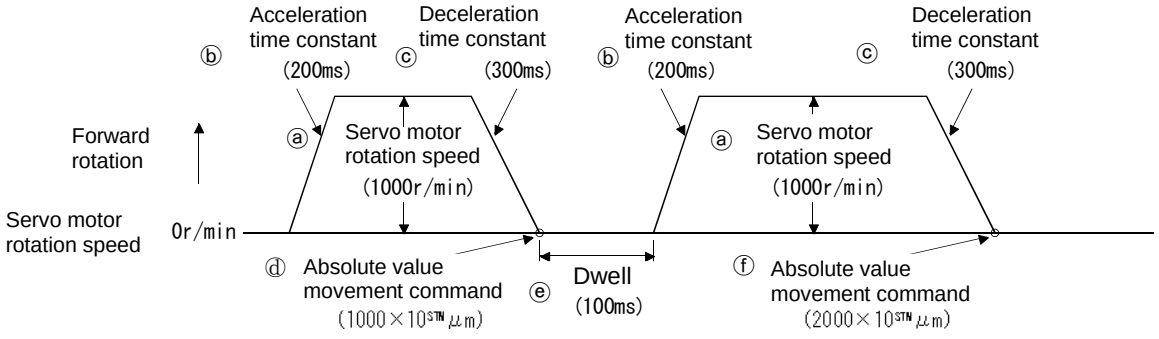
DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0	Selection details
0	0	0	0	0	0	0	0	Program No.1
0	0	0	0	0	0	0	1	Program No.2
0	0	0	0	0	0	1	0	Program No.3
0	0	0	0	0	0	1	1	Program No.4
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・
1	1	1	1	1	1	1	0	Program No.255
1	1	1	1	1	1	1	1	Program No.256

Note 0: OFF
1: ON

1) Program example 1

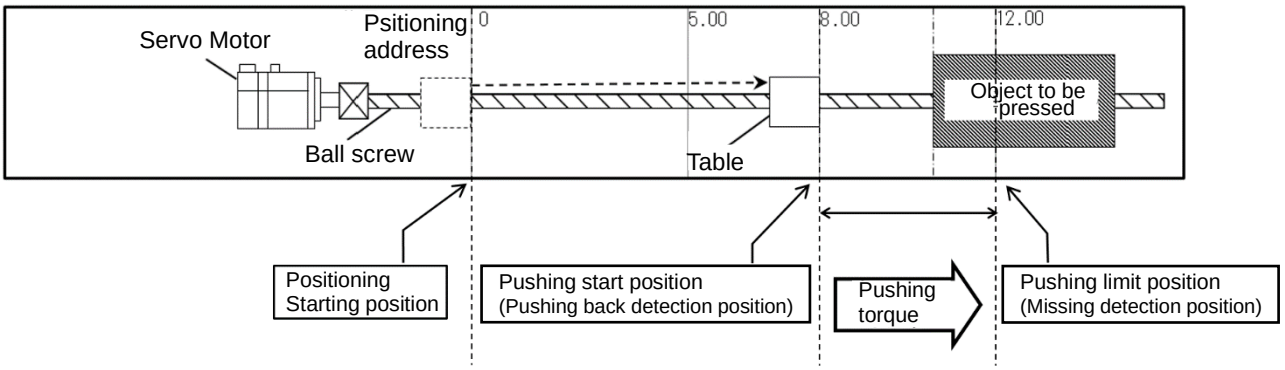
When executing two operations with the same servo motor speed, acceleration time constant, and deceleration time constant but different movement commands.

Program	Content		
SPN(1000)	Servo motor speed	1000[r/min]	ⓐ
STA(200)	Acceleration time constant	200[ms]	ⓑ
STB(300)	Deceleration time constant	300[ms]	ⓒ
MOV(1000)	Absolute value movement command	1000 [× 10 ^{STM} μm]	ⓓ
TIM(10 0)	Dwell	100[ms]	ⓔ
MOV(2000)	Absolute value movement command	2000 [× 10 ^{STM} μm]	ⓕ
STOP	Program stop		



7.6 Positioning Mode (Pushing Operation)

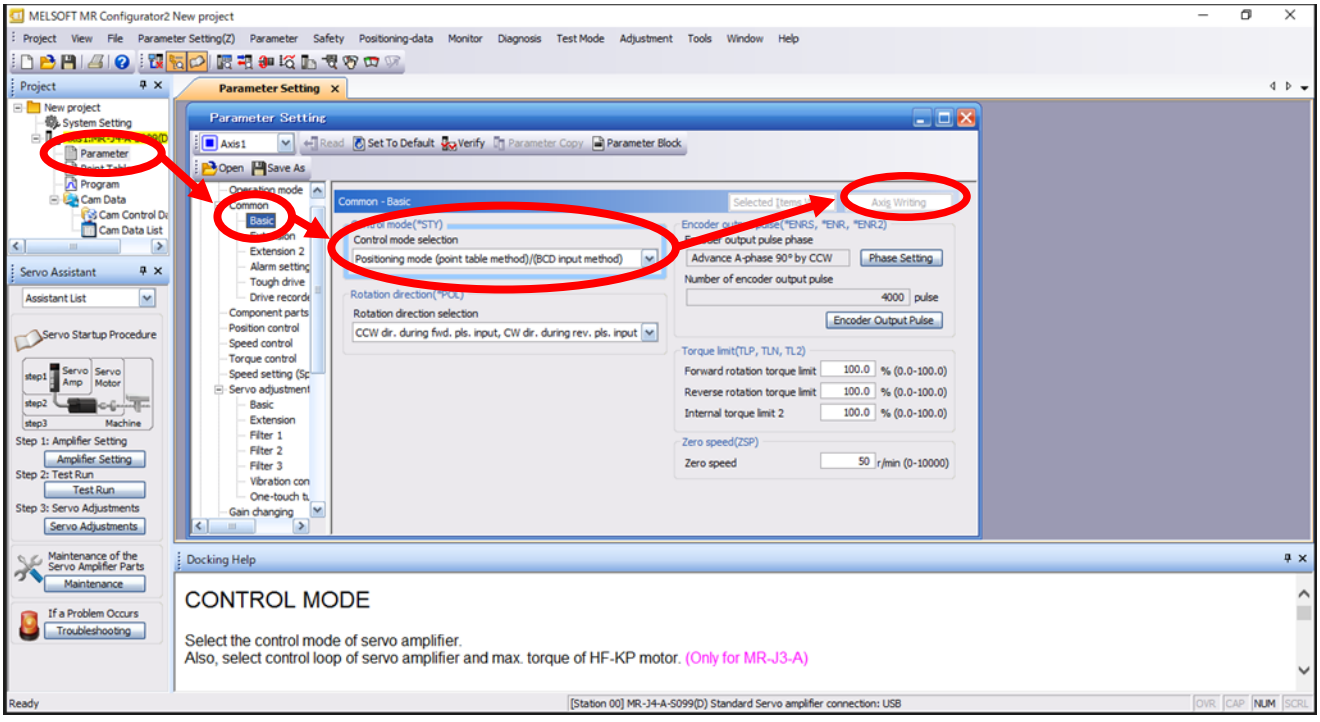
Pushing operation is to generate pushing torque in the direction from "pushing start position" to "pushing limit position" within the pushing range (between "pushing start position" and "pushing limit position").
Point table method pushing operation can be selected from positioning operation or pushing operation with the auxiliary function of point table data.
Each data of positioning operation from positioning start position to pushing start position and pushing operation with pushing torque ([0.1%] unit) within the pushing range is managed by point table data, and the execution of series of operation can be performed by ST1 (start signal) setting on.



For positioning mode operation (pushing operation), refer to "LECS B2-T □ Operation Manual, Chapter 17 ".

7.6.1 How to Set

For the control mode, select the positioning mode (point table) in the same way as the positioning mode (point table).

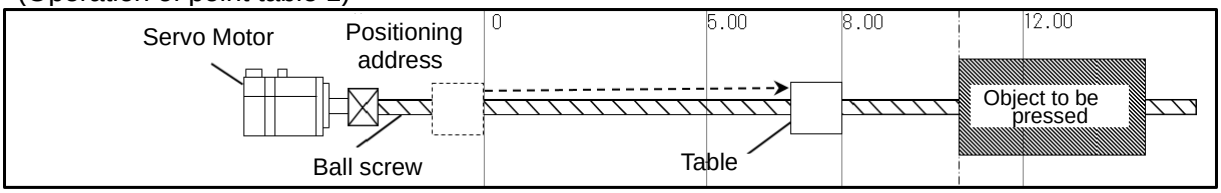


Refer to "LECSB2-T □ Operation Manual Chapter 17.2 " for connection examples of I/O signals.

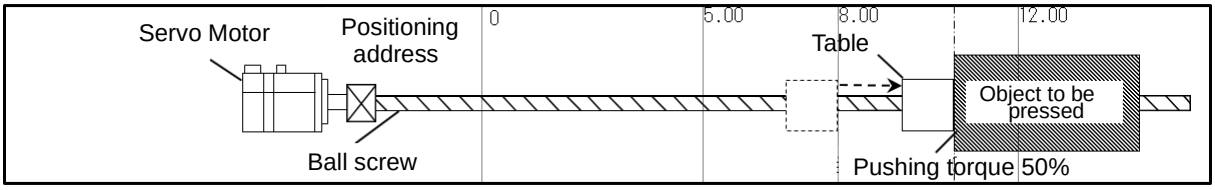
7.6.2 Point Table-based Operation Instruction Method

When using Point table method pushing operation, set each value of the point table using the setup software (MR Configurator2™) or the operation panel.
An example in which the pushing operation is divided into the following 3 steps will be explained.

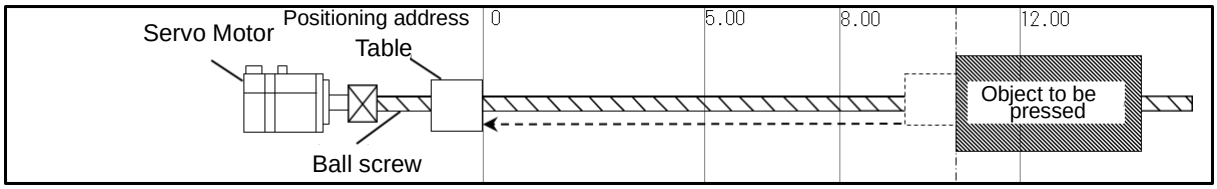
<STEP1> In positioning operation, move from the positioning start position to the pushing start position.
(Operation of point table 1)



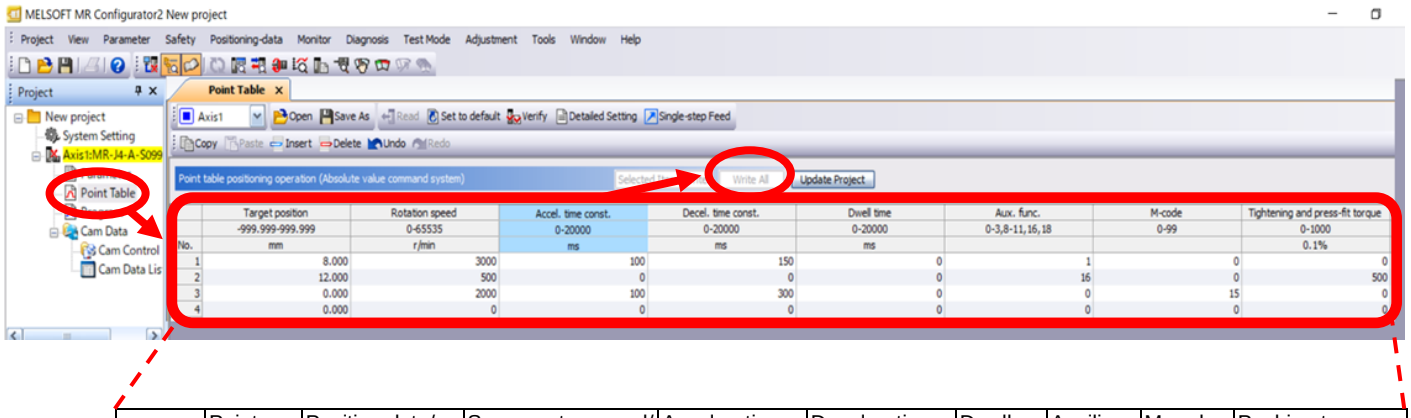
<STEP2> In the pushing operation, push the object to be pushed.
(Operation of point table 2)



<STEP3> Return to the positioning start position with positioning operation.
(Operation of point table 3)



Allocate a point table for each step.



		Point table number	Position data/ Pushing limit position [10^stm μm]	Servo motor speed/ speed limit value [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Auxiliary function	M-code	Pushing torque [0.1%]
STEP1 ⇒		1	8.00	3000	100	150	0	1	0	0
STEP2 ⇒		2	12.00	500	0	0	0	16	0	500
STEP3 ⇒		3	0	2000	100	300	0	0	15	0

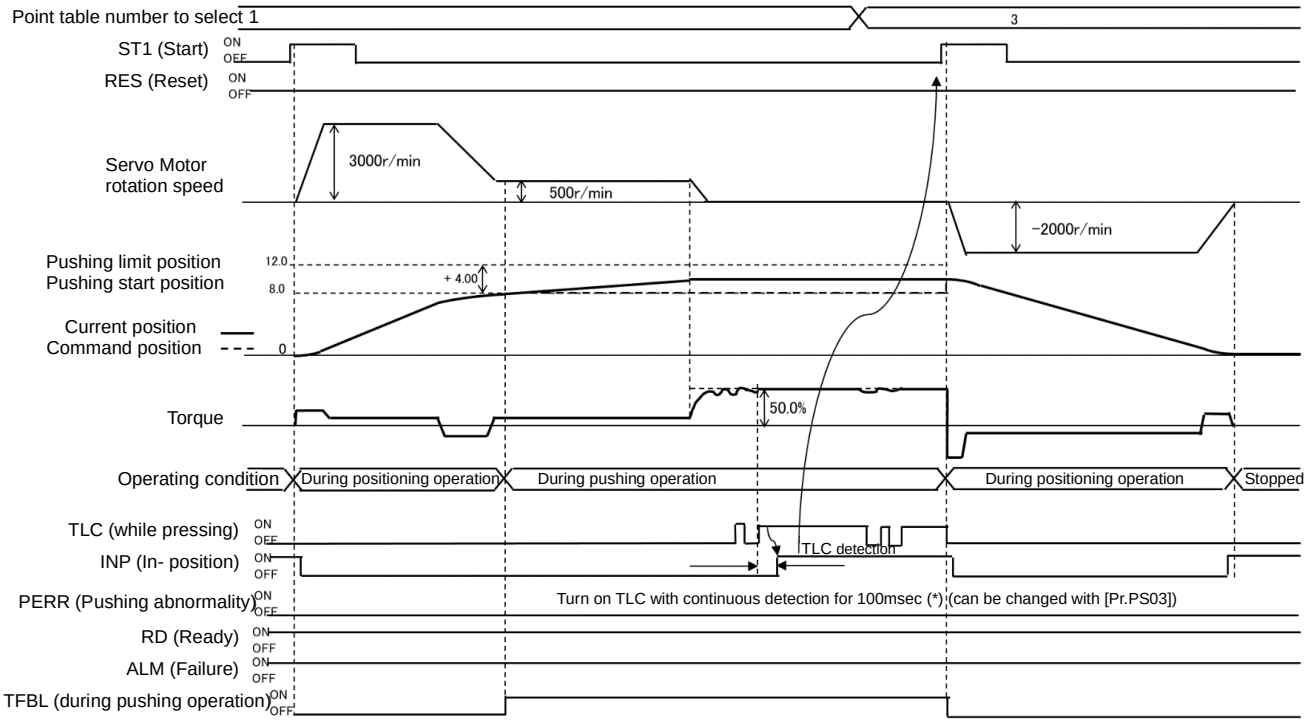
<STEP1> In positioning operation, move from the positioning start position to the pushing start position 8 mm.
Auxiliary function "1" execute <STEP2> after <STEP1> is completed.

<STEP2 > Start pushing at a speed of 500 r/min between the pushing start position of 8 mm and 12 mm.
Pushing is performed with a pushing torque of 50.0% at the time of pushing.
Auxiliary function " 16 " turns on ST1 (start signal) and continues pushing operation until < STEP3 > is executed.

<STEP 3 > When ST 1 (start signal) is turned on, it moves from the pushing position (8 to 12mm) to the positioning start position 0mm in positioning operation.

7.6.3 Timing Chart

The timing chart of the operation set in the point table in the previous chapter is shown.



7.6.4 Point Table Data List

Item	Setting range	Unit	Content
Position data/ Pushing limit position	-999999 ~ 999999 (Note1)	×10 STM μm ×10 (STM-4) inch 10-3 degrees pulse	Set the target address (Absolute value). This value can also be set using the teaching function. When the pushing operation is selected with the auxiliary function " 16 " or " 18 ", the limit position to be operated in the pushing operation is set.
Servo motor Rotation speed/ Speed limit value	0 ~ Allowable rotation speed	r/min mm/s (Note2)	Set the command rotation speed of the servo motor when positioning is executed. Auxiliary function " 16 " or " 18", the speed limit value during the pushing operation will be set. Set the value below the momentary permissible rotation speed of the servo motor used. During the pushing operation, if the setting exceeds [Pr.PS05 Pushing operation speed upper limit], the speed is limited by [Pr.PS05].
Acceleration time constant	0 ~ 20000	ms	Set the time to reach the rated speed of the servo motor.
Deceleration time constant	0 ~ 20000	ms	Set the time from the rated rotation speed of the servo motor until it stops.
Dwell	0 ~ 20000	ms	Set the dwell. " 0 ", "2", " 16 " or " 18 " is set for the auxiliary function, this point table No. dwell will be disabled. Auxiliary function to " 1 ", 3 ", " 8 " or "9" and dwell = 0 for continuous operation. When the dwell is set, the position command for the selected point table is completed, and after the set dwell elapses, the position command for the next point table is started. When performing the pushing operation, be sure to set "0" to the dwell in the point table immediately before the pushing operation. (Note4)
Auxiliary function	0 ~ 3, 8 ~ 11, 16, 18		Set the auxiliary function. 1) When using this point table for positioning operation (Absolute value command method) 0: Execute the selected single point table automatic operation. 1: Executes automatic continuous operation without stopping the next point table. 8: Executes automatic continuous operation without stopping the selected point table at start-up. 9: Execute automatic continuous operation without stopping point table number 1. 2) When using this point table for positioning operation (Incremental value command method) 2: Execute selected one point table automatic operation. 3: Executes automatic continuous operation without stopping the next point table. 10: Executes automatic continuous operation to the selected point table at startup 11: Execute automatic continuous operation without stopping point table number 1. 3) When using this point table in pushing operation (Absolute value command system) 16: Continues pushing operation until the next point table is executed when ST1 (start signal) is turned on. Set the pushing limit position with an absolute value. Auxiliary function Set after positioning operation with " 1 " or " 3 ". (Note3) (Note4) 4) When using this point table in pushing operation (incremental value command method) 18: When ST1 (Start signal) is turned on, the pushing operation continues until the next point table is executed. Set the pushing limit position with an incremental value. Auxiliary function Set after positioning operation with " 1 " or " 3 ". (Note3) (Note4) If a different direction of rotation is set, the motor rotates in the reverse direction after smoothing zero (Command output) is confirmed. " 1 " or " 3 " is set in the point table number 255, when the point table is executed [AL.61] occurs.
M-code	0 ~ 99		The 1st and 2nd digits of the M code are each output in 4 -bit binary. M code is used only for RS-422 communication. No M code is output when starting a point table number that includes pushing operation.

Pushing torque	0 ~ 1000	0.1%	Set Pushing torque ([0.1%] unit). This setting is valid when the pushing operation is selected with the auxiliary function " 16 " or " 18". Set as maximum torque = 1000 (in unit of [0.1%]). " 0 " (pushing torque 0.0%) is set, the pushing torque will be disabled. If the pushing torque is set over the upper limit, the pushing torque will be limited.

Note 1	When setting μ m and inch, the position of the decimal point is changed by the STM setting.
3	Independent pushing operation is not supported. If a point table number set to "16 " or "18" is specified in the point table data auxiliary function and ST1 (start signal) is turned on, [AL7F.4 Pushing start error] will occur. increase.
4	[AL7F.4 Pushing start error] will occur if any value other than "0" is set for the dwell in the point table immediately before the pushing operation.

8. Troubleshooting

8.1 Alarm and Warning

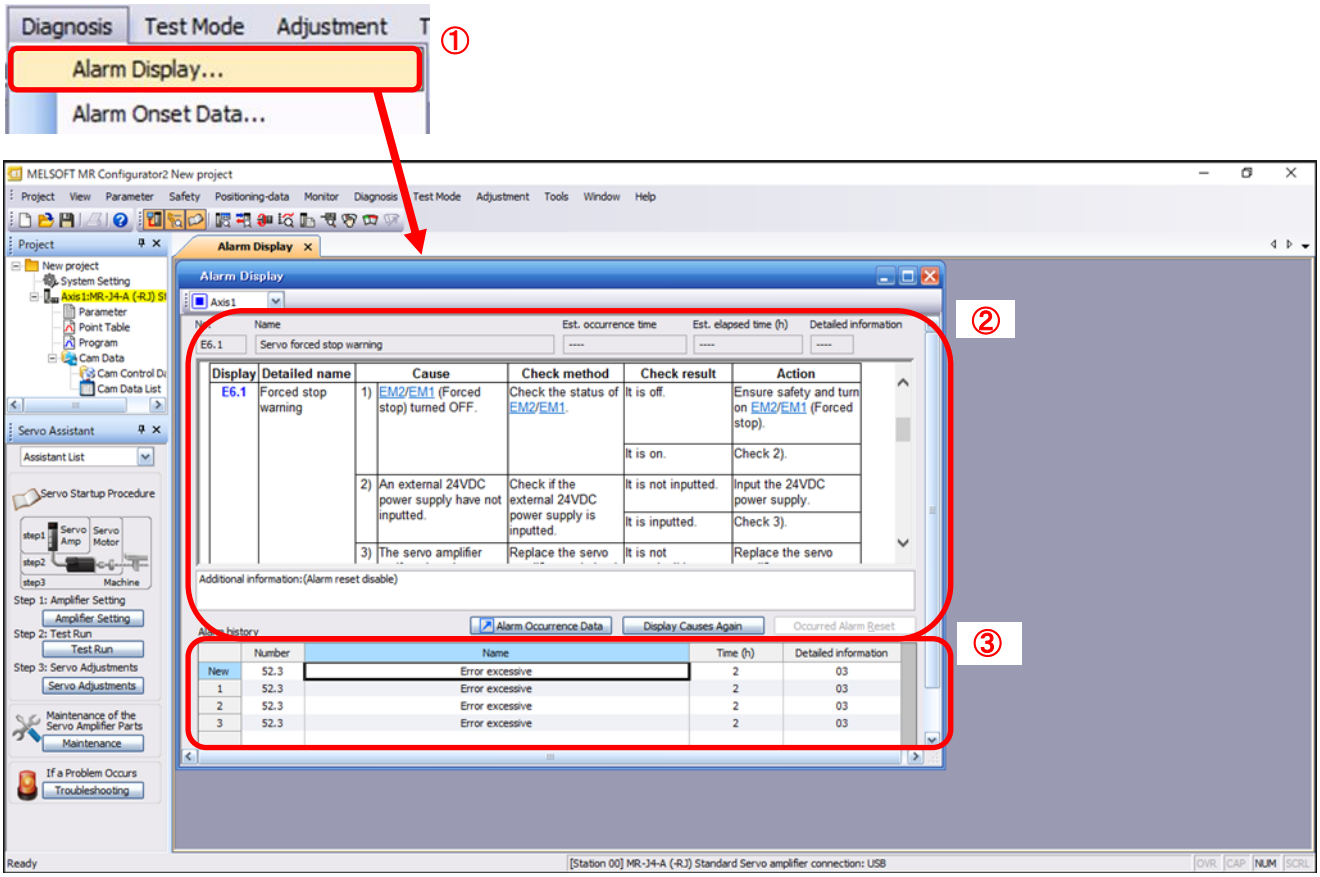
Point
● As soon as an alarm occurs, turn off the servo-on (SON) and shut off the main circuit power supply.

Displays alarms and warnings when an abnormality occurs during operation. If an alarm or warning occurs, take appropriate measures according to "LECSB2-T □ Operation Manual, Chapter 8". ALM turns off when an alarm occurs.
After removing the cause of the alarm, the alarm can be reset by any of the methods indicated by ○ in the alarm reset column. The warning will be canceled automatically when the cause of occurrence is eliminated.

8.2 Alarm Display

The alarm display function of the setup software displays the details of alarms and warnings currently occurring in the driver. In addition, the history of alarms that occurred in the driver in the past is displayed in a list.

(1) Click "Diagnosis" - "Alarm Display" in the setup software to display the "Alarm Display" window.
(2) Displays the details of alarms and warnings currently occurring in the driver. It is not displayed when there is no alarm or warning.
(3) Lists the history of alarms that have occurred in the past (Up to 16). (No warning is displayed)



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SMC Corporation

Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362
URL https://www.smcworld.com