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Operation Manual
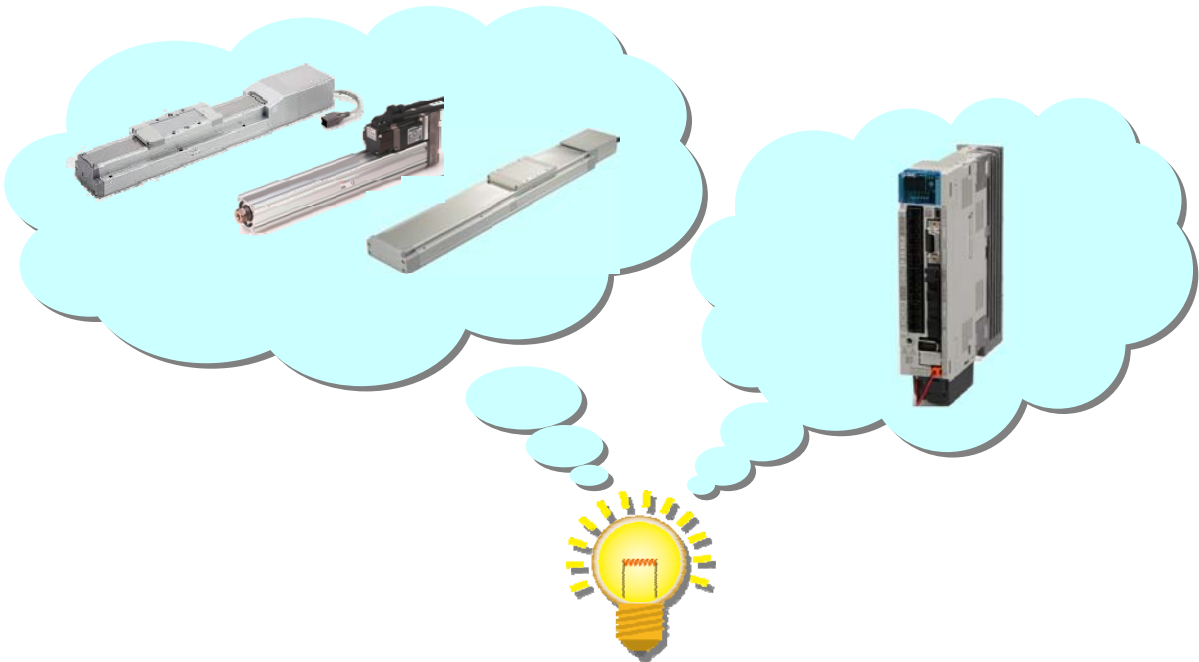（Simplified edition）

PRODUCT NAME

AC Servo Motor Driver (SSCNET Ⅲ/H Type)

MODEL / Series / Product Number

LECSS2-T□　Series

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CONTENTS

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LECSS2-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), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems
   ISO 4413: Hydraulic fluid power -- General rules relating to systems
   IEC 60204-1: Safety of machinery -- Electrical equipment of machines (Part 1: General requirements)
   ISO 10218-1992: Manipulating industrial robots -- Safety
    JIS B 8370: General rules for pneumatic equipment.
    JIS B 8361: General rules for hydraulic equipment.
    JIS B 9960-1: Safety of machinery – Electrical equipment for machines. (Part 1: General requirements)
    JIS B 8433-1993: Manipulating industrial robots - Safety. etc.
*2) Labor Safety and Sanitation Law, etc.

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

⚠Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.
The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.
This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly.
The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
1) Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2) Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3) An application which could have negative effects on people, property, or animals requiring special

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

Note that the ⚠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.

LECSS2-T□ Series / Driver
Safety Instructions

⚠ Caution

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

Limited warranty and Disclaimer/Compliance Requirements

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

Limited warranty and Disclaimer

**The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*3)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.**

For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

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

** *3) Vacuum pads are excluded from this 1 year warranty.**
**   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.**
**   Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due**
**   to the deterioration of rubber material are not covered by the limited warranty.**

Compliance Requirements

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

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Introduction

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

The setup software (MR Configurator2 : LEC-MRC2□) uses the communication function of the driver to perform parameter setting changes, graph display, test operation, etc. on a personal computer.
When setup software (MR Configurator2) is used, the selection of the model of LECSS2-T□ is needed.
Please select 'MR-J4-B' by "Model" - "New" - "Project".

1. Procedure before operation

1.1   Flow chart

Wiring for power supply and PLC
Refer to P6 [2. Wiring for Power Supply]

Driver axis No. setting
Refer to P8 [3. Axis No. settings]

Parameter setting (Driver side)
Refer to P11 [5. Parameter setting (Driver side)]

Parameter setting (PLC side)
Refer to P13 [6. Parameter setting (PLC side)]

Set item of PLC side.
Functions such as original position returning and positioning depends on PLC function.
This operation manual is based on the MITSUBISHI ELECTRIC QD77MS simple motion module.

Home position return
Refer to P16 [7. Homeposition return (PLC)]

[Positioning operation]
Refer to P18 [8. Positioning operation (PLC)]

2. Wiring for Power Supply

2.1 Wiring for power supply

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

(1) LECSS2-T□ (Absolute encoder)

EX.) Power supply is AC200V single phase

[1] Power supply input terminals, L_1, L_3: Provide specified power supply to input terminals L_1 and L_2.

[2] ・Connect the motor power supply input terminal (U, V, W) to the driver power terminal (U, V, W).
　　・Connect the motor ground terminal to the driver ground terminal.
　　・Connect the cable for detector.

[3] Connect the 200VAC external power supply to the power supply for the control circuit.

2.2 SSCNETⅢ cable wiring

SSCNETⅢ cable wiring

(1) SSCNETⅢ cable connection between the driver and PLC

For CN1A connector, connect SSCNETⅢ cable connected to PC or PLC...etc in host side or driver.

For CN1B connector, connect SSCNETⅢ cable connected to driver in lower side.

For CN1B connector of the final axis, use the cap provided with the driver to finalize the connection and prevent the connector from becoming dirty .
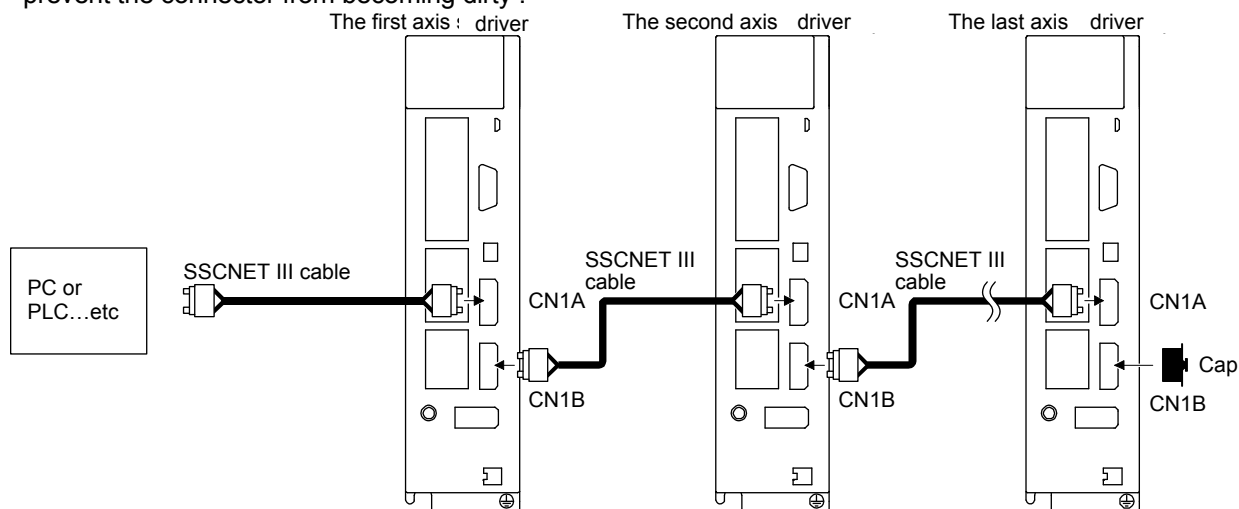
⚠ WARNING

Do not allow the light beam generated from CN1A・CN1B connector of driver or the end of SSCNETⅢ cable to shine directly into eye(s).

Allowing the light beam to come into direct contact with eye(s), may cause damage to one's eye(s).

(The light source of SSCNETⅢ complies with Class1 defined in JIS C6802 or IEC60825-1.)

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(2)Removing and inserting of the connector

(a) Inserting

While holding the tab on the SSCNETⅢ cable connector, insert the connector into CN1A・CN1B of driver until you hear the click.

If the end face of optical code tip is dirty, optical transmission may be interrupted and may cause malfunctions.

If the tip becomes dirty, wipe with a bonded textile, etc.

Do not use a solvent such as alcohol.
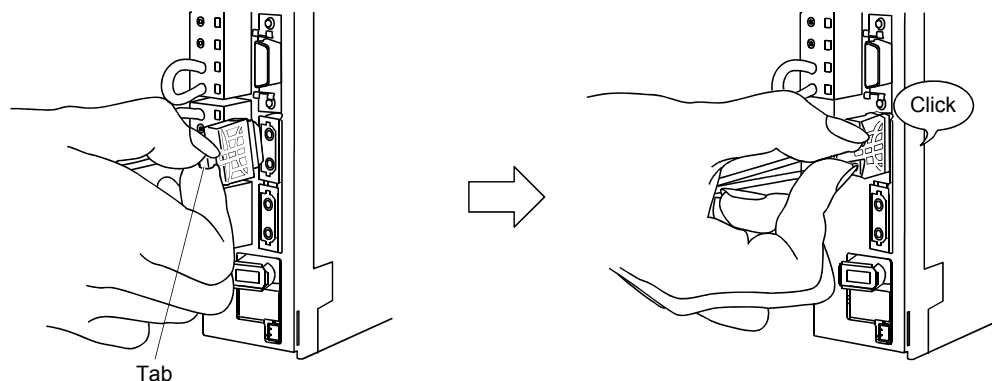
(b) Removal

While holding the tab on the SSCNETⅢ cable connector,   remove the connector.

Once the SSCNETⅢ cable has been removed fromdriver, be sure to place the cap on the connector end of driver to prevent it from becoming dirty.

For SSCNETⅢ cable, attach the tube for protection of the optical code's end face on the end of connector.

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3. Axis No. settings

Set the control axis No. by the rotary switch.

> POINT
>
> ・ The control axis number set to rotary axis setting switch (SW1) should be the same as the one set to the servo system PC or PLC...etc.
> ・ Use a flat blade screwdriver with the width of 2.1 to 2.3mm and the end thickness of 0.6 to 0.7mm to change the rotary switch setting.
> ・ If the test operation mode is selected using the test operation change switch (SW2-1), SSCNETⅢ communication at all points after the driver is disconnected.

Use the rotary axis setting switch (SW1) to set the control axis number for the servo. If the same numbers are set to different control axes in a single communication system, the system will not operate properly. The control axes may be set independently of the SSCNET Ⅲ cable connection sequence.
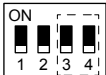
Rotary axis setting switch (SW1)

ON
1 2 3 4
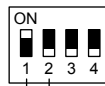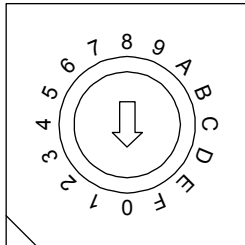
Control axis deactivation switch
Set to the "OFF (down)" position.

Test operation select switch
Set to the "ON (up)" position.

Set the test operation select switch to the "Up" Position, when performing the test operation mode by using setup software (MR Configurator2)

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Auxiliary axis number setting switch	Axis selection rotary switch	Control axis No.
	0	1
	1	2
	2	3
	3	4
	4	5
	5	6
	6	7
ON ▮▮▮▮ 1 2 3 4	7	8
	8	9
	9	10
	A	11
	B	12
	C	13
	D	14
	E	15
	F	16

Auxiliary axis number setting switch	Axis selection rotary switch	Control axis No.
	0	17
	1	18
	2	19
	3	20
	4	21
	5	22
	6	23
ON ▮▮▮▮ 1 2 3 4	7	24
	8	25
	9	26
	A	27
	B	28
	C	29
	D	30
	E	31
	F	32

Auxiliary axis number setting switch	Axis selection rotary switch	Control axis No.
	0	33
	1	34
	2	35
	3	36
	4	37
	5	38
	6	39
ON ▮▮▮▮ 1 2 3 4	7	40
	8	41
	9	42
	A	43
	B	44
	C	45
	D	46
	E	47
	F	48

Auxiliary axis number setting switch	Axis selection rotary switch	Control axis No.
	0	49
	1	50
	2	51
	3	52
	4	53
	5	54
	6	55
ON ▮▮▮▮ 1 2 3 4	7	56
	8	57
	9	58
	A	59
	B	60
	C	61
	D	62
	E	63
	F	64

4. Parameter list (Driver side)

Parameters require setting. Please set the parameters, if necessary.
Refer to [5. Assignment of input/output signal] and "LECSS2-T□ Operation Manual", Chapter 5 for details.
Refer to "LECSS2-T□ Operation Manual", Chapter 5 for parameters which are not mentioned in this clause.

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

No.	Symbol	Name		Initial value	Unit
PA01	STY	Operation mode		1000h	
PA03	ABS	Absolute position detection system	(Note 1)	0000h	
PA04	AOP1	Function selection A-1		2000h	
PA08	ATU	Auto tuning mode	(Note 1)	0001h	
PA09	RSP	Auto tuning response	(Note 1)	16	
PA10	INP	In-position range	(Note 1)	1600	pulse
PA14	POL	Rotation direction selection	(Note 1)	0	

(2) Extension setting parameters (No.PC□ □)

No.	Symbol	Name	Initial value	Unit
PC17	COP4	Function selection C-4	0000h	

(3) I/O setting parameters (No.PD□ □)
   Change the assignment of the input/output signal and select the input signal automatic ON.
   Refer to "LECSS2-T□ Operation Manual", Section 5.2.4 for details.

(Note 1)Parameters which can be set by the upstream equipment.
   During PLC operation, parameters are stored in the QD77MS module and transmitted to the LECSS2-T□. Refer to PLC manual for checking the setting method of parameters.

```
┌──────────┐                    ┌──────────┐
│ QD77MS   │                    │LECSS2-T□ │
│          │      ═════════▷     │          │
│          │                    │          │
└──────────┘                    └──────────┘
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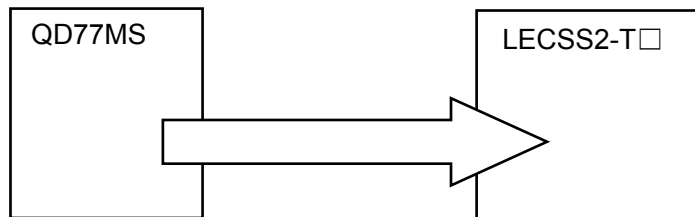
5. Parameter setting (Driver side)

Applicable parameters are explained below. Refer to "LECSS2-T□ Operation Manual", Chapter 5 for details.

The setup software, MR Configurator2 :LEC-MRC2□ is required for setting parameters with the program system.

*1. Installation of software Version 1.09K or higher is required.
*2. Setup software (MR Configurator2)should be prepared by the user.
*3. USB cable (LEC-MR-J3USB) is required for installation of the software.
*4. LECSS2-T□ cannot be used by Setup software (MR Configurator:LEC-MR-SETUP221□）.

5.1 Absolute position detection system

Select absolute position detection system
Set parameter: [PA03]

Parameter			Initial value	Unit	Setting range
No.	Symbol	Name			
PA03	ABS	Absolute position detection system	0000h		Refer to the text.

> POINT
>
> ・This parameter is made valid when power is switched off, then on after setting, or when the driver reset has been performed.
>
> ・This parameter cannot be used in the speed control mode.

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

Parameter No.PA03

0	0	0	

Selection of absolute position detection system
0: Used in incremental system
1: Used in absolute position detection system

EX.) Use absolute position detection system
[PA03] = 0001

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5.2 Forced stop input selection

Set if the forced stop input is used.
If the product is used with emergency stop (EM1), set the parameter [PA04] to "2000".
Forced stop (EM1) must be ON to start the motor.

Parameter			Initial value	Unit	Setting range
No.	Symbol	Name			
PA04	AOP1	Function selection A-1	2000h		Refer to the text.

POINT

・This parameter is made valid when power is switched off, then on after setting,
or when the driver reset has been performed.

The servo forced stop function is avoidable.

Parameter No.PA04

| 2 | | 0 | 0 |

Selection of servo forced stop
0: Valid (Forced stop (EM1) is used.)
1: Invalid (Forced stop (EM1) is not used.)

When not using the forced stop (EM1) of driver, set the selection of servo forced stop to invalid (21□ □). At this time, the forced stop (EM1) automatically turns on inside the driver.
EX.) In order to nullify servo forced stop, [PA04] = 2100.

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6. Parameter setting (PLC side)

The setting of PLC parameter in this operation manual is based on the MITSUBISHI ELECTRIC QD77MS simple motion module.

Parameter setting for the PLC side cannot be set at driver side.

Please confirm to the operation manual or the manufacturer for used positioning units or motion controllers for details.

6.1 Electronic gear

Set the electronic gear. Set the number of pulses per rotation of the actuator lead or motor.

Item		Setting value, setting range	Default value	Setting value buffer memory address. (Note 2) QD77MS2, QD77MS4 QD77MS16
Pr.1 Unit setting		0:mm	3	0+150n
		1:inch		
		2:degree		
		3:PLS		
Movement amount per pulse	Pr.2 Pulse number per rotation(AP) (Unit: PLS)	1 to 200000000 (Note 1)	20000	2+150n 3+150n
	Pr.3 Moving amount per rotation (AL)	The setting value range differs according to the "Pr.1 Unit setting".	20000	4+150n 5+150n
	Pr.4 Unit magnification (AM)	1:1 times	1	1+150n
		10:10 times		
		100:100 times		
		1000:1000 times		
Pr.7 Bias speed at start		Not used	0	6+150n 7+150n

(Note 1) LECSS2-T□ sets [4194304]

(Note 2) n:(Axis No.)-1

Pr.1 Unit setting

Set the unit used for defining positioning operations. Choose from the following units depending on the type of control target : mm, inch, degree, or PLS. Different units can be defined for different axes(axis 1 to 4).

(Ex.) Different units (mm, inch, degree, and PLS) are applicable to different systems:
- mm、inch   X-Y table, conveyor (Select mm or inch depending on the machine specifications)
- degree   Rotating body (360 degrees/rotation)
- PLS   X-Y table, conveyor

- When you change the unit, note that the values of other parameters and data will not be changed automatically.
  After changing the unit, check if the parameter and data values are within the allowable range.
  Set "degree" to exercise speed-position switching control (ABS mode)

Pr.2 to Pr.4 Electronic gear

Mechanical system value used when the QD77MS performs positioning control.
The settings are made using Pr.2 to Pr.4
The electronic gear is expressed by the following equation.

$$\text{Electronic gear} = \frac{\text{No. of pulse per motor rotation(AP)}}{\text{Movement amount per rotation (AL)} \times \text{Unit magnification (AM)}}$$

- When positioning has been performed, an error (mechanical system error) may be produced between the specified movement amount and the actual movement amount.
  If this occurs, the error can be corrected using the Electronic gear.
  Refer to the operation manual for used equipment for details.

Pr.2 No. of pulse(s) per rotation(AP)
　　Set the number of pulses required for a complete rotation of the motor shaft.
　　If you are using the LECSS2-T□, set the value given as the "resolution per servomotor rotation" in the speed/position detector specifications.

　　　　Number of pulses per rotation (AP) = Resolution per servomotor rotation (Note 1)
　　　　　　　　　　　　　　　　　　　　　　　　(Note 1) LECSS2-T□　sets [4194304]

Pr.3 Movement amount per rotation (AL),　Pr.4 Unit magnification (AM)
　　The amount how the workpiece moves with one motor rotation is determined by the mechanical structure.
　　If the worm gear lead (μm/rev) is PB and the deceleration rate is 1/n, then

　　　　Movement amount per rotation (AL) = PB x 1/n.

　　However, the maximum value that can be set for this "movement amount per rotation (AL)" parameter is 20000000.0μm(20m). Set the "movement amount per rotation (AL)" does not exceed this maximum value.

　　　Movement amount per rotation (AL) =　PB×1/n
　　　　　　　　　　　　　　　　= Movement amount per rotation (AL) × Unit magnification (AM)

6.2　Stroke limit

Wiring for stroke limit. If no wiring is used, set the parameter for signal logic selection.

　Wiring of hardware stroke limit.
　　If the hardware stroke limit function is used, QD77MS/ driver upper limit/ lower stroke limit wiring should be configured as shown below.
　　(When Pr.22, "Input signal logic selection" is default value)
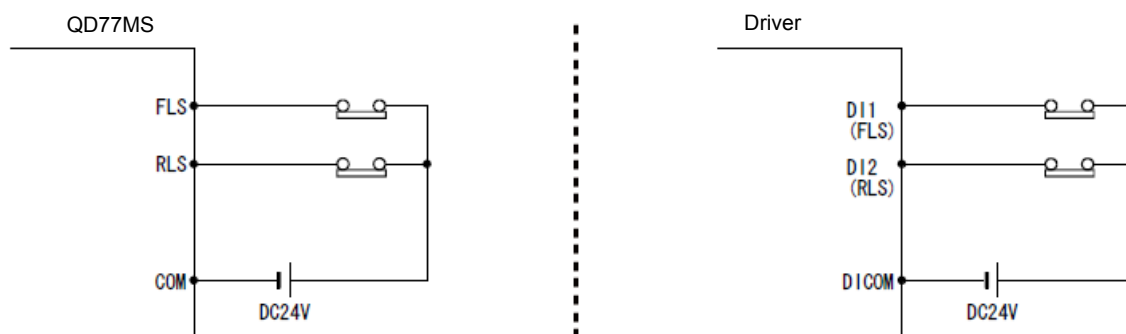
　　Note) The upper limit switch should be installed in the direction in which the "Current feed value" increases. The lower limit switch should be installed in the direction in which the "Current feed value" decreases.
　　　　If the install position of the upper/lower limit switches is inverted, the hardware stroke limit function will not operate properly. In addition, the servomotor will not stop.

　When the logic of FLS and RLS is set to "positive logic" using Pr.22, "Input signal logic selection", positioning control can be performed, even if FLS and RLS are not wired.

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6.3 Operating conditions

The following conditions must be satisfied in order to start operation.

Signal name		Signal status		Device	
				QD77MS2, QD77MS4	QD77MS16
Interface signal	PLC READY signal	ON	PLC CPU preparation	Y0	
	READY signal	ON	QD77MS preparation	X0	
	All axis servo ON	ON	All axis servo ON	Y1	
	Synchronization flag (Note 1)	ON	QD77MS buffer memory Accessible	X1	
	Axis stop signal	OFF	Axis stop signal is OFF	Y4 to Y7	Cd.180 Axis stop
	M code ON signal	OFF	M code ON signal is OFF	X4 to X7	Md.31 Status:b12
	Error detection signal	OFF	There is no error	X8 to XB	Md.31 Status:b13
	BUSY signal	OFF	BUSY signal OFF	XC to XF	X10 to X1F
	Start complete signal	OFF	Start complete signal is OFF	X10 to X13	Md.31 Status:b14
External signal	Forced stop input signal	ON	There is no forced stop input	-	
	Stop signal	OFF	Stop signal is OFF	-	
	Upper limit (FLS)	ON	Within limit range	-	
	Lower limit (RLS)	ON	Within limit range	-	

(Note 1) When the synchronous setting of the PLC is made in the nonsynchronous mode, this must be provided as an interlock.

When it is made in the synchronous mode, no interlock must be provided in the program because the flag is turned ON when calculation is run on the PLC.

Refer to the operation manual for used equipment for details.

7. Home position return (PLC)

Home position returning in this operation manual is based on the MITSUBISHI ELECTRIC QD75MH positioning unit,.
- The original position returning parameter cannot be set at driver side. Please confirm to the operation manual or the manufacturer for used positioning units or motion controllers for details.

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7.1 Returning to home position

Setting the home position returning parameter

Item	Setting value, setting range	Default value	Setting value buffer memory address. (Note 1) QD77MS2, QD77MS4, QD77MS16
Pr.43 OPR method	0:Near-point dog method	0	70+150n
	4:Count method 1)		
	5:Count method 2)		
	6:Data set method		
	7: Scale origin signal detection method		
Pr.44 OPR direction	0:Positive direction (address increase direction)	0	71+150n
	1:Negative direction (address increase direction)		
Pr.43 OP address	The setting value range differs according to the "Pr.1 Unit setting".	0	72+150n 73+150n
Pr.46 OPR speed		1	74+150n 75+150n
Pr.47 Creep speed		1	76+150n 77+150n
Pr.48 OPR retry	0:Do not retry OPR with limit switch	0	78+150n
	1:Retry OPR with limit switch		
Pr.50 Setting for the movement amount after near-point dog ON	The setting value range differs according to the "Pr.1 Unit setting".	0	80+150n 81+150n
Pr.51 OPR acceleration time selection	0:Pr.9 Acceleration time 0	0	82+150n
	1:Pr.25 Acceleration time 1		
	2:Pr.26 Acceleration time 2		
	3:Pr.27 Acceleration time 3		
Pr.52 OPR deceleration time selection	0:Pr.10 Deceleration time 0	0	83+150n
	1:Pr.28 Deceleration time 1		
	2:Pr.29 Deceleration time 2		
	3:Pr.30 Deceleration time 3		
Pr.53 OP shift amount	The setting value range differs according to the "Pr.1 Unit setting".	0	84+150n 85+150n
Pr.54 OPR torque limit value	1 to 1000（%）	300	86+150n
Pr.55 Operation setting for incompletion of OPR	0: Positioning control is not executed.	0	87+150n
	1: Positioning control is executed.		
Pr.56 Speed designation during OP shift	0: OPR speed	0	88+150n
	1: Creep speed		
Pr.57 Dwell time during OPR retry	0 to 65535 (ms) 0 to 32767　　　:Set as a decimal 32768 to 65535: Convert into hexadeciamal and set	0	89+150n

(Note 1) n:(Axis No.)-1

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The methods for original position returning (compatiable with the MITSUBISHI ELECTRIC QD77MS positioning modules, .
The following table outlines four methods that can be used for the OPR method. (The OPR method is one of the variables set in the OPR parameters. It is set in Pr.43 "OPR method" for basic OPR parameters .)

| Pr.43 OPR method	Operation details
Near-point dog method	Deceleration is initiated by the OFF --> ON of the near-point dog. (Speed is reduced to Pr.47 "Creep speed"). The operation stops once after the near-point dog turns ON and then OFF. Later the operation restarts and then stops at the first zero signal to complete the OPR. That position is specified as original position.
Count method (1)	The deceleration starts by the OFF --> ON of the near-point dog and the moves at Pr.47 "Creep speed". The machine stops once after moving the distance set in Pr.50 "Setting for the movement amount after near-point dog ON" from the OFF --> ON position. Later the operation restarts and then stops at the first zero signal to complete the machine OPR.
Count method (2)	The deceleration starts by the OFF --> ON of the near-point dog, and the machine moves at Pr.47 "Creep speed" The machine moves the distance set in the Pr.50 "Setting for the movement amount after near-point dog ON" from the near-point dog OFF --> ON position, and stops at that position. The machine OPR is then regarded as completed.
Data set method	The position where the machine OPR has been performed becomes an OP. The current feed value and feed machine value are overwritten to the OP address.
Scale origin signal detection method	The machine moves in the opposite derection against of Pr.44 "OPR direction" at the Pr.46 "OPR speed" by the OFF --> ON of the near-point dog, and a deceleration stop is carried out once at the first zero signal. Later the operation moves in direction of Pr.44 "OPR direction" at the Pr.47 "Creep speed", and then stops at the detected nearest zero point to complete the machine OPR.

8. Positioning operation (PLC)

Position in this operation manual is based on the MITSUBISHI ELECTRIC QD77MS positioning unit.
The position parameter cannot be set at driver side. Please confirm to the operation manual or the manufacturer for used positioning units or motion controllers for details.

8.1 Setting of Operation data

Set operation parameters.

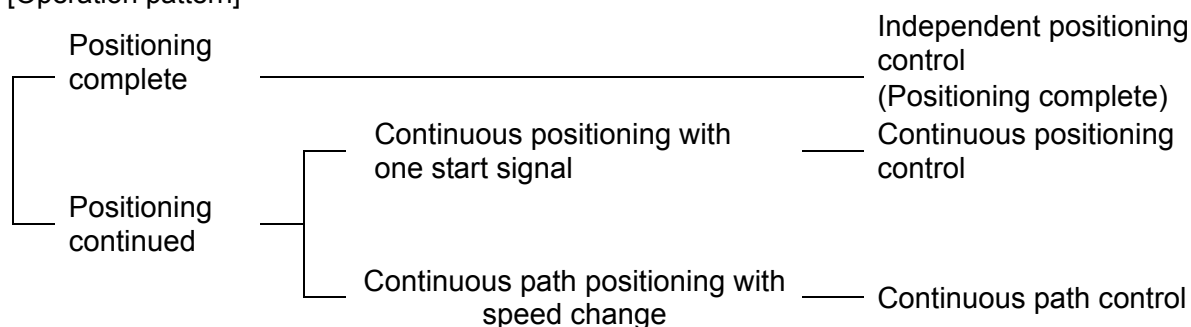| Item		Setting value		Default value	Buffer memory address for setting (Note 2)	
					QD77MS2, QD77MS4	QD77MS16
Positioning identifier	Da.1 Operation pattern	00: Positioning complete	a	0000H	2000+6000n	6000+1000n
		01: Continuous positioning control				
		11: Continuous path control	b			
	Da.2 Control system	(Note 1)				
	Da.3 Acceleration time No.	0:Pr.9 Acceleration time 0	c			
		1:Pr.25 Acceleration time 1				
		2:Pr.26 Acceleration time 2				
		3:Pr.27 Acceleration time 3				
	Da.4 Deceleration time No.	0:Pr.10 Deceleration time 0	d			
		1:Pr.28 Deceleration time 1				
		2:Pr.29 Deceleration time 2				
		3:Pr.30 Deceleration time 3				
	Da.5 Axis to be Interpolated (QD77MS2, DQ77MS4)	0: Axis 1	e			
		1: Axis 2				
		2: Axis 3				
		3: Axis 4				
	Da.6 Position address/ movement amount	The setting value range differs according to the "Da.2 Control system".		0	2006+6000n 2007+6000n	6006+1000n 6007+1000n
	Da.8 Command speed	The setting value range differs depending on the "Pr.1 Unit setting". -1: Current speed (Speed set for previous positioning data No.)		0	2004+6000n 2005+6000n	6004+1000n 6005+1000n
Pr.9 Acceleration time 0		1 to 8388608(ms)		1000	12+150n 13+150n	
Pr.10 Deceleration time 0		1 to 8388608(ms)		1000	14+150n 15+150n	
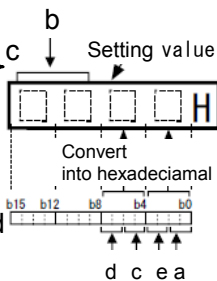
(Note 1) Refer to the operation manual for used equipment for details.
(Note 2) n:(Axis No.)-1

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Da.1 Operation pattern
The operation pattern designates whether positioning of a certain data No. is to be ended with just that data, or whether the positioning for the next data No. is to be carried out in succession.

[Operation pattern]

```
Positioning                                        Independent positioning
complete                                           control
                                                   (Positioning complete)
                    Continuous positioning with    Continuous positioning
                    one start signal               control
Positioning
continued
                    Continuous path positioning with
                    speed change                   Continuous path control
```

1) Positioning complete
   Set to execute positioning to the designated address, and then complete positioning.
2) Continuous positioning control
   Positioning is carried out successively in order of data Nos. with one start signal.
   The operation halts at each position indicated by a positioning data.
3) Continuous path control
   Positioning is carried out successively in order of data Nos. with one start signal.
   The operation does not stop at each positioning data.

Da.2 Control system
Set the "control system" for carrying out positioning control.
Note) ·When "JUMP instruction" is set for the control system, the "Da.9 Dwell time" and "Da.10 M code" setting details will differ.
       ·In cases you selectd "LOOP" as the control system, the "Da.10 M code" should be set differently from other cases.
       ·If "degree" is set for "Pr.1 Unit setting", circular interpolation control cannot be carried out.
       (The "Circular interpolation not possible error" will occur when executed (error code: 535).)

Da.3 Acceleration time No.
Set "acceleration time 0 to 3" to use for the acceleration time during positioning.
   0: Use the value set in "Pr.9 Acceleration time 0"
   1: Use the value set in "Pr.25 Acceleration time 1"
   2: Use the value set in "Pr.26 Acceleration time 2"
   3: Use the value set in "Pr.27 Acceleration time 3"

Da.4 Deceleration time No.
Set "deceleration time 0 to 3" to use for the deceleration time during positioning.
   0: Use the value set in "Pr.10 Deceleration time 0"
   1: Use the value set in "Pr.28 Deceleration time 1"
   2: Use the value set in "Pr.29 Deceleration time 2"
   3: Use the value set in "Pr.30 Deceleration time 3"

Da.5 Axis to be interpolated (QD77MS2, QD77MS4)

Set the target axis (partner axis) for operation under the 2-axis interpolation control.
  0: Select the axis 1 as the target axis (partner axis)
  1: Select the axis 2 as the target axis (partner axis)
  2: Select the axis 3 as the target axis (partner axis)
  3: Select the axis 4 as the target axis (partner axis)

(Note) ·Do not specify the own axis number or any number except the above.
         (If you do, the "Illegal interpolation description command error" will occur during the program execution (error code: 521)
       ·This item does not need to be set in 3 or 4-axis interpolation is selected.
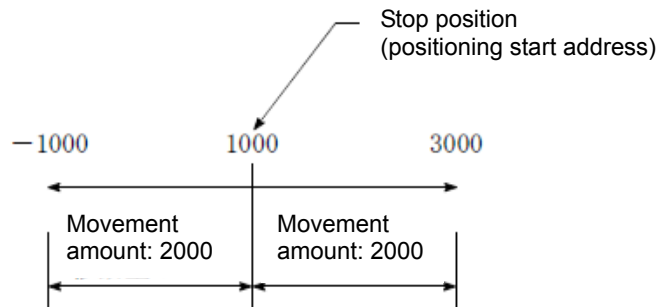
Da.6 Position address/movement amount

Set the address to be used as the target value for positioning control.
The setting value range differs according to the "Da.2 Control system".

Absolute (ABS) system, current value changing
  ·The setting value (positioning address) for the ABS system and current value changing is set with an absolute address (address from OP).

Da.8 Command speed

Set the command speed for positioning.

 (1) If the set command speed exceeds "Pr.8 Speed limit value", positioning will be carried out at the speed limit value.

 (2) If "-1" is set for the command speed, the current speed (speed set for previous positioning data No.) will be used for positioning control. Use the current speed for uniform speed control, etc. If "-1" is set for continuing positioning data, and the speed is changed, the following speed will also change.

 Note that When starting positioning, if "-1" speed is set for the positioning data that carries out positioning control first, the error "Command speed is not set" (error code: 503) will occur, and the positioning will not start.

 Refer to the operation manual for used equipment for details on the errors.

Pr.1 Setting value	Set value set by PLC program (Unit)
0:mm	1 to 2000000000($\times 10^{-2}$mm/min)
1:inch	1 to 2000000000($\times 10^{-3}$inch/min)
2:degree	1 to 2000000000($\times 10^{-3}$degree/min)　(Note 1)
3:PLS	1 to 50000000(PLS/s)

(Note 1) The command speed range is 1 to 2000000000($\times 10^{-3}$degree/min), but it will be decupled and become 1 to 2000000000($\times 10^{-2}$degree/min) by setting Pr.83 "Speed control 10 x multiplier setting for degree axis" to valid.

Pr.9 Acceleration time 0, Pr.10 Deceleration time 0

Pr.9 "Acceleration time 0" specifies the time for the speed to increase from zero to the Pr.8 "speed limit value"

Pr.10 "Acceleration speed 0" specifies the time for the speed to decrease from the Pr.8 "speed limit value" to zero.
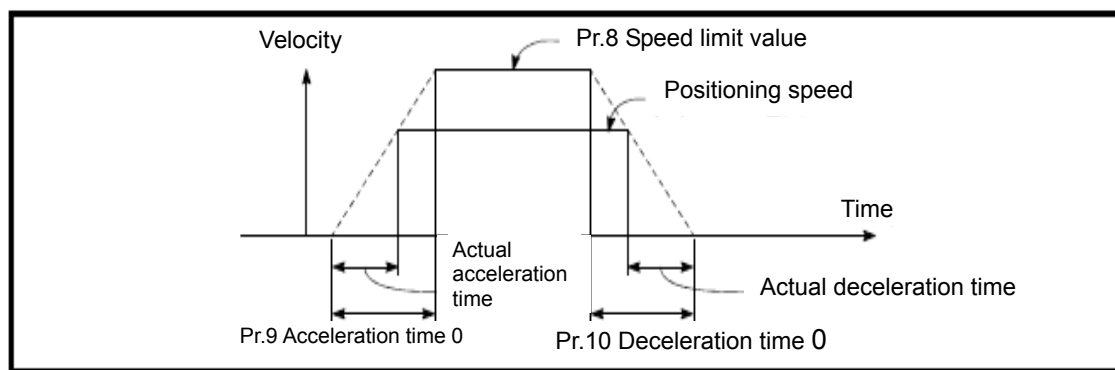
1) If the positioning speed is set lower than the parameter-defined speed limit value, the actual acceleration/deceleration time will be relatively short. Thus, set the maximum positioning speed equal to or only a little lower than the parameter-defined speed limit value.

2) These settings are valid for OPR, positioning and JOG operations.

3) When the positioning involves interpolation, the acceleration/deceleration time defined for the reference axis is valid.

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8.2 Movement MOD

Timing chart for positioning.

Timing chart to start "main positioning control"

Refer to the operation manual for used equipment for details.

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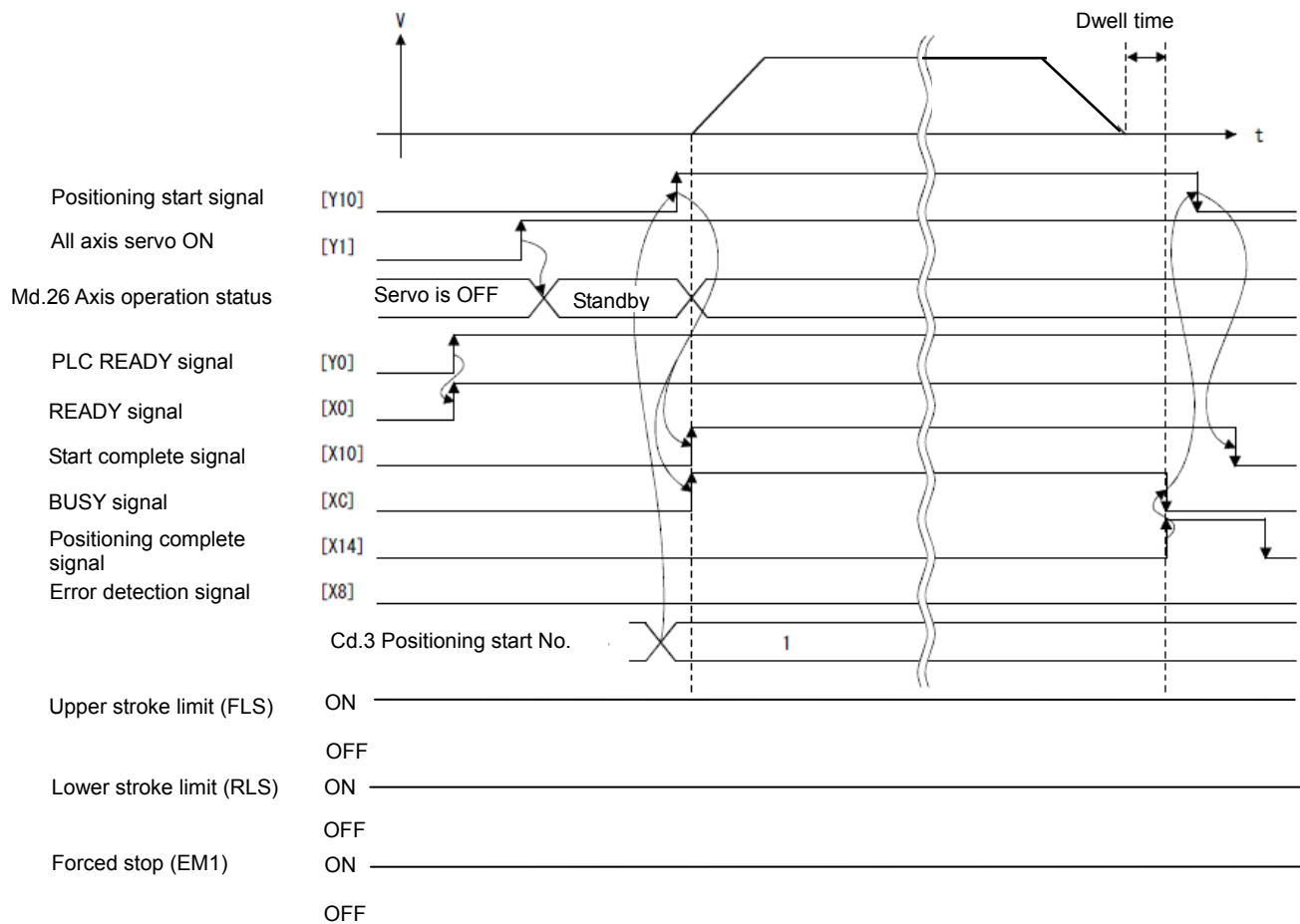
9. The recommended the parameter for each actuator

Please change the parameter values by use of the customer.
Refer to "LECSS2-T□ Operation Manual", Section 5 for details.

9.1 The recommended value of the parameter [LEF]

Series	Lead symbol		LEFS25T6			LEFS32T7			LEFS40T8		
			H	A	B	H	A	B	H	A	B
	Lead		20	12	6	24	16	8	30	20	10
Parameter	Para. No.	Initial value	Recommended value								
Regenerative option	PA02	0000	**0000(Non) / 0002(LEC-MR-RB-032)**								
Rotation direction selection	PA14	0	**1(+：Counter motors side)**								
Load to motor inertia moment ratio	PB06	7	7								
Function selection E-3	PE41	0000	0000								

Series	Lead symbol		LEFS25(R,L)T6			LEFS32(R,L)T7			LEFS40(R,L)T8		
			H	A	B	H	A	B	H	A	B
	Lead		20	12	6	24	16	8	30	20	10
Parameter	Para. No.	Initial value	Recommended value								
Regenerative option	PA02	0000	**0000(Non) / 0002(LEC-MR-RB-032)**								
Rotation direction selection	PA14	0	0(+：Counter motors side)								
Load to motor inertia moment ratio	PB06	7	7								
Function selection E-3	PE41	0000	0000								

Series	Lead symbol		LEFB25 T6	LEFB25U T6	LEFB32 T7	LEFB32U T7	LEFB40 T8	LEFB40U T8
			S					
	Lead		54					
Parameter	Para. No.	Initial value	Recommended value					
Regenerative option	PA02	0000	**0000(Non) / 0002(LEC-MR-RB-032)**					
Rotation direction selection	PA14	0	**1(+： Counter motors side)**	0(+： Counter motors side)	**1(+： Counter motors side)**	0(+： Counter motors side)	**1(+： Counter motors side)**	0(+： Counter motors side)
★Load to motor inertia moment ratio	PB06	7	**50**					
★Function selection E-3	PE41	0000	**0001 (Robust filter enabled)**					

★Parameter should be changed.
▢ Different from the initial value.

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

* For LECSS2-T□, please set the electronic gear with PC, PLC etc. in your application.

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9.2   The recommended value of the parameter [LEJ]

Series	Lead symbol		H	A	B	H	A	B	T	
	Lead		24	16	8	30	20	10	27	42
			LEJS40T6			LEJS63T7			LEJB40T6	LEJB63T7
Parameter	Para. No.	Initial value	Recommended value							
Regenerative option	PA02	0000	**0000(Non) / 0002(LEC-MR-RB-032) / 0003(LEC-MR-RB-12)**							
Rotation direction selection	PA14	0	**1** **(＋：Counter motors side)**						0 (＋：Counter motors side)	
★Load to motor inertia moment ratio	PB06	7	7						**50**	
★Function selection E-3	PE41	0000	0000						**0001 (Robust filter enabled)**	

★ Parameter should be changed.

◻ Different from the initial value.

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

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

* For LECSS2-T□, please set the electronic gear with PC, PLC etc. in your application.

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9.3 The recommended value of the parameter [LEY]

Series			LEY25T6 / LEYG25T6			LEY25DT6 / LEYG25DT6			LEY32T7 / LEYG32T7			LEY32DT7 / LEYG32DT7		
	Lead symbol		A	B	C	A	B	C	A	B	C	A	B	C
	Lead		12	6	3	12	6	3	20	10	5	16	8	4
Parameter	Para. No	Initial value	Recommended value											
Regenerative option	PA02	0000	**0000 (Non)/ 0002 (LEC-MR-RB-032)**											
Rotation direction selection	PA14	0	0 (+：Counter motors side)			**1 (+：Counter motors side)**			0 (+：Counter motors side)			**1 (+：Counter motors side)**		
Load to motor inertia moment ratio	PB06	7	7											
Function selection E-3	PE41	0000	0000											

Series			LEY63T8				LEY63DT8		
	Lead symbol		A	B	C	L	A	B	C
	Lead		20	10	5	2.86	20	10	5
Parameter	Para. No	Initial value	Recommended value						
Regenerative option	PA02	0000	**0000 (Non)/ 0002 (LEC-MR-RB-032)/ 0003 (LEC-MR-RB-12)**						
Rotation direction selection	PA14	0	0 (+：Counter motors side)				**1 (+：Counter motors side)**		
Load to motor inertia moment ratio	PB06	7	7						
Function selection E-3	PE41	0000	0000						

☐ Different from the initial value.

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

* For LECSS2-T☐, please set the electronic gear with PC, PLC etc. in your application.

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