



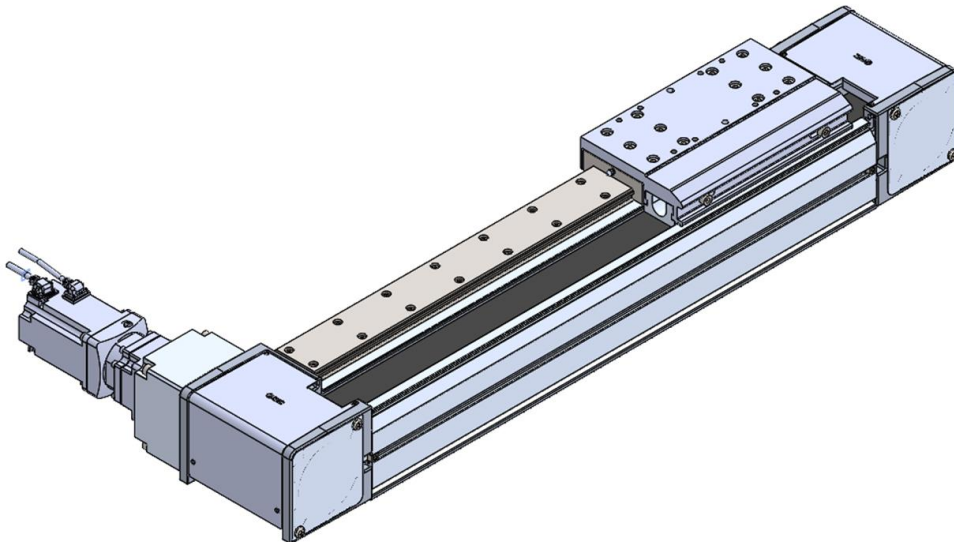
Operation Manual

PRODUCT NAME

**Electric Actuator / Slider Type Belt Drive
(AC Servo 400 – 750W、Motorless)**

MODEL / Series / Product number

LET-X11 Series



*The descriptions in this operation manual are for when the “AC servo motor specification” or “motorless specification” is selected. * For details on the driver, please also check the operation manual for each driver.

SMC Corporation

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Slider Type Belt Drive 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. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments.

Use under such conditions or environments is not covered.

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, fuel 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.



Slider Type Belt Drive Safety Instructions

Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing business.

Use in non-manufacturing business is not covered.

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

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 regulation 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.

Product specific notes

Product specific notes

Wiring and cables / Common precautions

Warning

1. **Adjusting, mounting or wiring change should never be done before shutting off the power supply to the product.**
Electrical shock, malfunction and damaged can result.
2. **Never disassemble the cable. Use only specified cables.**
3. **Never connect or disconnect the cable or connector with power on.**

Caution

1. **Wire the connector securely. Do not apply any voltage to the terminals other than those specified in the product manual.**
2. **Wire the connector securely.**
Check for correct connector wiring and polarity.
3. **Take appropriate measures against noise.**
Noise in a signal line may cause malfunction. As a countermeasure, separate high voltage and low voltage cables, and shorten wiring lengths, etc.
4. **Do not route wires and cables together with power or high voltage cables.**
The product can malfunction due to interference of noise and surge voltage from power and high voltage cables to the signal line. Route the wires of the product separately from power or high voltage cables.
5. **Take care that actuator movement does not catch cables.**
6. **Operate with cables secured. Avoid bending cables at sharp angles where they enter the product.**
7. **Avoid twisting, folding, rotating or applying an external force to the cable.**
Risk of electric shock, wire break, contact failure and loss of control for the product can happen.
8. **Select “Robotic type cables” in case of inflecting cable (encoder / motor / rock) repeatedly.**
Refer to the “Driver operation manual” for the bending life of the bending radius of the cable.
9. **Confirm proper wiring of the product.**
Poor insulation (interference with other circuits, poor insulation between terminals and etc.) can apply excessive voltage or current to the product causing damage.

[Transportation]

Caution

1. **Do not carry or swing the product by the motor or cable.**

Electric actuators / Common precautions

Design and selection

Warning

- 1. Be sure to read the Operation Manual (this manual and the one for the driver: LEC series).**
Handling or usage/operation other than that specified in the Operation Manual may lead to breakage and operation failure of the product. Any damage attributed to the use beyond the specifications is not guaranteed.
- 2. There is a possibility of dangerous sudden action by the product if sliding parts of machinery are twisted due to external forces etc.**
In such cases, human injury may occur, such as by catching hands or feet in the machinery, or damage to the machinery itself may occur. Design the machinery should be designed to avoid such dangers.
- 3. A protective cover is recommended to minimize the risk of personal injury.**
If a driven object and moving parts of the product are in close proximity, personal injury may occur. Design the system to avoid contact with the human body.
- 4. Securely tighten all stationary parts and connected parts so that they will not become loose.**
When the product operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.
- 5. Consider a possible loss of power source.**
Take measures to prevent injury and equipment damage even in the case of a power source failure.
- 6. Consider behavior of emergency stop of whole system.**
Design the system so that human injury and/or damage to machinery and equipment will not be caused, when it is stopped by a safety device for abnormal conditions such as a power outage or a manual emergency stop of whole system.
- 7. Consider the action when operation is restarted after an emergency stop or abnormal stop of whole system.**
Design the system so that human injury or equipment damage will not occur upon restart of operation of whole system.
- 8. Never disassemble or modify (including additional machining) the product.**
An injury or failure can result. It will cause the loss of the product performance.
- 9. When using it vertically, diagonally, or in other conditions with height differences, it is necessary to build in a safety device (Latches, Movable bolts, Fall prevention devices, etc.).**
The rod may fall due to the weight of work. The safety device should not interfere with normal operation of the machine.
- 10. Do not exceed product specification, even if workload is supported by external linear guides.**
The moment to actuator is reduced by external guide, but required ability for transport (relationship between speed and workload) is not reduced.

Caution

- 1. Operate within the limits of the maximum usable stroke.**
The product will be damaged if it is used with the stroke which is over the maximum stroke. Refer to the specifications of the product.
- 2. When the product repeatedly cycles with partial strokes, lubrication can run out. Operate it at a full stroke at least once a day or every 1 000 strokes.**
- 3. Do not use the product in applications where excessive external force or impact force is applied to it. The product can be damaged.**
Each component that includes motor is made with accurate tolerance. So even slightly deformed or miss-alignment of component may lead operation failure of the product.
- 4. Refer to a common auto switch /matter (Best Pneumatics No 2) when an auto switch is built in and used.**

Mounting

Warning

1. **Install and operate the product only after reading the Operation Manual carefully and understanding its contents. Keep the manual in a safe place future reference.**
2. **Observe the tightening torque for screws.**

Tighten the screws to the recommended torque for mounting the product.
3. **Do not make any alterations to this product.**

Alterations made to this product may lead to a loss of durability and damage to the product, which can lead to human injury and damage to other equipment and machinery.
4. **When using external guide, the guide axis should be parallel to the actuator axis.**

There will be damage/excessive wear on the lead screw if the external guide is not parallel.
5. **When an external guide is used, connect the moving parts of the product and the load in such a way that there is no interference at any point within the stroke.**

Do not scratch or dent the sliding parts of the product tube or piston rod etc., by striking or grasping them with other objects. Components are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation.
6. **Prevent the seizure of rotating parts.**

Prevent the seizure of rotating parts (pins, etc.) by applying grease.
7. **Do not use the product until you verify that the equipment can operate properly.**

After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted properly.
8. **Cantilever**

When the actuator is operated at high speed while it is fixed at one end and free at the other end (flange type, foot type, double clevis type, direct mount type), a bending moment may act on the actuator due to vibration generated at the stroke end, which can damage the actuator. In such a case, install a support bracket to suppress the vibration of the actuator body or reduce the speed so that the actuator does not vibrate. Use a support bracket also when moving the actuator body or when a long stroke actuator is mounted horizontally and fixed at one end.
9. **When mounting the actuator or attaching the work piece, do not apply strong impact or large moment.**

If an external force over the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.
10. **Maintenance space**

Allow sufficient space for maintenance and inspection.

Handling

Warning

- 1. If abnormal heating, smoking or fire, etc., occurs in the product, immediately shut off the power supply.**
- 2. Immediately stop operation if abnormal operation noise or vibration occurs.**
If abnormal operation noise or vibration occurs, the product may have been mounted incorrectly. Unless operation of the product is stopped for inspection, the product can be seriously damaged.
- 3. Never touch the rotating part of the motor or moving part of the actuator while in operation.**
Alterations made to this product may lead to a loss of durability and damage to the product, which can lead to human injury and damage to other equipment and machinery.
- 4. When installing, adjusting, inspecting or performing maintenance on the product, driver and related equipment, be sure to shut off the power supply to them. Then, lock it so that no one other than the person working can turn the power on, or implement measures such as a safety plug.**

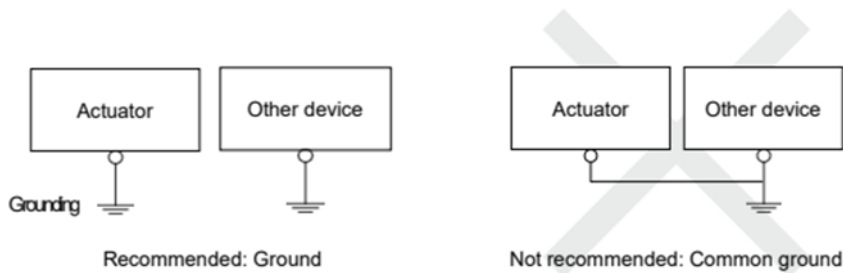
Caution

- 1. Keep the driver and product combined as delivered for use.**
The product is set in parameters for shipment. If it is combined with a different parameter, failure can result.
- 2. Check the product for the following points before operation.**
 - a) Damage to power supply line and signal line.
 - b) Looseness of the connector to each power line and signal line.
 - c) Looseness of the actuator /cylinder and controller /driver mounting.
 - d) Abnormal operation.
 - e) Emergency stop of the total system.
- 3. When more than one person is performing work, decide on the procedures, signals, measures and resolution for abnormal conditions before beginning the work. Also, designate a person to supervise work other than those performing work.**
- 4. Actual speed of the product will be changed by the workload.**
Before selecting a product, check the catalog for the instructions regarding selection and specifications.
- 5. Do not apply a load, impact or resistance in addition to a transferred load during return to origin.**
In the case of the return to origin by pushing force, additional force will cause displacement of the origin position since it is based on detected motor torque.
- 6. Do not remove the nameplate.**
- 7. Operation test should be done by low speed. Start operation by predefined speed after confirming there is no trouble.**
- 8. Do not apply impact/collision/resistance for mover of actuator in operation.**
It will cause decrease of product's life, damage to product, and so on.

[Grounding]

Warning

- 1. Be certain to ground the actuator.**
- 2. Dedicated grounding should be used.**
Grounding should be to a D-class ground. (Ground resistance of 100 or less.)
- 3. Grounding should be performed near the actuator to shorten the grounding distance.**
- 4. The cross-sectional area of this wire shall be a minimum of 2 mm².**
- 5. Avoid common grounding with other devices.**



[Unpackaging]

⚠ Caution

1. Check the received product is as ordered.

If the different product is installed from the one ordered, injury or damage can result.

[China Energy Label]

The China Energy Label is affixed to the supported motor that is assembled to models based on “Implementation Rules for Energy Efficiency Labeling of Permanent Magnet Synchronous Motor” in China. The label is affixed to the motor of models with the energy efficiency grade 3 or higher. For details, check the QR code on the label.

Operating environment

⚠ Warning

1. Avoid use in the following environments.

- a. Locations where a large amount of dusts and cutting chips are airborne.
- b. Locations where the ambient temperature is outside the range of the temperature specification (refer to specifications).
- c. Locations where the ambient humidity is outside the range of the humidity specification (refer to specifications).
- d. Locations where corrosive gas, flammable gas, sea water, water and steam are present.
- e. Locations where strong magnetic or electric fields are generated.
- f. Locations where direct vibration or impact is applied to the product.
- g. Areas that are dusty, or are exposed to splashes of water and oil drops.
- h. Areas exposed to direct sunlight (ultraviolet ray).

2. Do not use in an environment where the product is directly exposed to liquid, such as cutting oils.

If cutting oils, coolant or oil mist contaminates the product, failure or increased sliding resistance can result.

3. Install a protective cover when the product is used in an environment directly exposed to foreign matters such as dust, cutting chips and spatter.

Play or increased sliding resistance can result.

4. Shade the sunlight in the place where the product is applied with direct sunshine.

5. Shield the product if there is a heat source nearby.

When there is a heat source surrounding the product, the radiated heat from the heat source can increase the temperature of the product beyond the operating temperature range. Protect it with a cover, etc.

6. Grease oil can be decreased due to external environment and operating conditions, and it deteriorates lubrication performance to shorten the life of the product.

[Storage]

⚠ Warning

1. Do not store the product in a place in direct contact with rain or water drops or is exposed to harmful gas or liquid.

2. **Store in an area that is shaded from direct sunlight and has a temperature and humidity within the specified range (-10°C to 60°C and 90%RH or less No condensation or freezing).**
3. **Do not apply vibration and impact to the product during storage.**

Maintenance

Warning

1. **Do not disassemble or repair the product.**
Fire or electric shock can result. Contact SMC, in case of disassembly for the maintenance.
2. **Before modifying or checking the wiring, the voltage should be checked with a tester 5 minutes after the power supply is turned off.**
Electrical shock can result.

Caution

1. **Maintenance should be performed according to the procedure indicated in the Operating Manual.**
Incorrect handling can cause an injury, damage or malfunction of equipment and machinery.
2. **Removal of product.**
When equipment is serviced, first confirm that measures are in place to prevent dropping of work pieces and run-away of equipment, etc., and then cut the power supply to the system. When machinery is restarted, check that operation is normal with actuators in the proper positions.

[Lubrication]

Caution

1. **The product has been lubricated for life at manufacturer, and does not require lubrication in service.**
Please contact us when lubricating.

Precautions for actuator with lock

Warning

1. **Do not use the lock as a safety lock or a control that requires a locking force.**
The lock used for the product with a lock is designed to prevent dropping of work piece.
2. **When using it in a vertical or diagonal direction, or in other conditions with height differences, it is recommend the use of a locking actuator.**
If the product is not equipped with a lock, the product will move and drop the work piece when the power is removed.
3. **"Measures against drops" means preventing a work piece from dropping due to its weight when the product operation is stopped and the power supply is turned off.**
4. **Do not apply an impact load or strong vibration while the lock is activated.**
If an external impact load or strong vibration is applied to the product, the lock will lose it's holding force and damage to the sliding part of the lock or reduced lifetime can result. The same situations will happen when the lock slips due to a force hight than its holding force, as this will accelerate the wear to the lock.
5. **Do not apply liquid or oil and grease to the lock or its surrounding.**
When liquid or oil and grease is applied to the sliding part of the lock, its holding force will be reduce significantly. Or, lock sliding part performance and condition changes may be cause of lock release malfunction.
6. **Take measures against drops and check that safety is assured before mounting, adjustment and inspection of the product.**
If the lock is released while the mounting posture is vertical, diagonal or with height differences, the workpiece may fall under its own weight.

Electric actuators / Slider type Common precautions

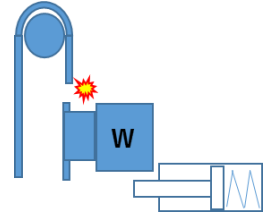
Design

Warning

1. **When mounting it vertically, at an angle, or in other situations where there is a height difference, install safety measures from the outside.**

(Latches, Movable bolts, Fall prevention devices, etc.)

- Design the structure so that the human body does not come into direct contact with the driven object or moving parts of the actuator. Install a protective cover to prevent direct contact with the human body, or if there is a risk of contact, install a sensor or the like to ensure a safe structure such as an emergency stop before contact is made.
- Even after the actuator has stopped, do not approach the movable range until it is sufficiently safe.
- The load may fall due to a power outage or a broken belt, which may cause serious damage to the human body or the machine. Be sure to select a motor with lock.
- Implement safety measures externally to prevent damage from falling due to broken belt. (Latches, Movable bolts, Fall prevention devices, etc.)



Caution

1. **Do not apply a load in excess of the actuator specification.**

A product should be selected based on the maximum work load and allowable moment. If the product is used outside of the operating specification, eccentric load applied to the guide will become excessive and have adverse effects such as creating play in the guide, reduced accuracy and reduced product life.
2. **Do not use the product in applications where excessive external force or impact force is applied to it. The product can be damaged.**

The components including the motor are manufactured to precise tolerances. So that even a slight deformation may cause malfunction.

Selection

Warning

1. **Do not exceed the speed limit of the actuator specification.**

Select a suitable actuator by the relationship of allowable work load and speed. Noise or reduction of accuracy may occur if the actuator is operated in excess of its specification and could lead to reduced accuracy and reduced product life.
2. **When the product repeatedly cycles with partial strokes (100mm), lubrication can run out. Operate it at a full stroke at least once a day or every 1000 strokes.**
3. **In case that external force is applied, select the actuator at total workload including external force.**

When a cable duct or flexible moving tube is attached to the actuator, the sliding resistance of the table increases and may lead to operational failure of the product.
4. **Use the acceleration/deceleration within the range that does not exceed the specification limit.**

This can cause malfunctions such as tooth skipping of the belt.
5. **Do not operate the motor in a state where the torque exceeds 100% of the rated value without reaching the set speed.**

This can cause malfunctions such as tooth skipping of the belt.
6. **If the actuator is to be installed in a position other than horizontal installation, use an actuator with a lock.**

If you use an actuator without a lock, there is no holding force when the power or servo is turned off, so the workpiece may drop.

Handling

Warning

1. Do not allow the table (slider) to hit the end of stroke.

If an incorrect input instruction is given, such as using it outside the specification range or changing the driver setting/origin position to give an operation instruction outside the actual stroke, the table (slider) can conflict. Perform a trial run to confirm that the table does not hit the end of stroke.

If the table collides with the stroke end, the guide, belt, housing, etc. will be damaged and will not operate normally.

Also, take measures against drops since the workpiece will drop freely due to its own weight when it is vertical.



Caution

1. The actual speed of this actuator is affected by the workload and stroke.

Check specifications with reference to the model selection section of the catalog.

2. Do not apply a load, impact or resistance in addition to a transferred load during return to origin.

In the case of return to origin by pushing force, additional force will cause displacement of the origin position since it is based on detected motor torque.

3. Do not scratch or gouge the body or the table.

The flatness of the mounting surface will be deteriorated and it can cause play in the guide and increased sliding resistance.

4. Do not apply strong impact and too much moment.

When external force that exceeds the allowable moment is applied, it can cause play in the guide and increased sliding resistance.

5. Keep the flatness of mounting surface to within [0.1mm or less for length 500mm].

Insufficient flatness of the workpiece or the surface onto which the actuator body is to be mounted can cause play in the guide and increased sliding resistance.

6. When installing this product, fix it with more side supports and T-nuts than the number of installations.

Reducing the number of mounting units will affect performance, such as increasing the displacement of the table.

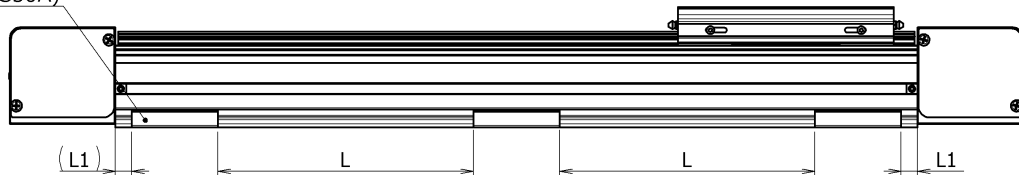
7. Do not allow the table to hit the workpiece in the positioning operation and positioning area.

8. When mounting the actuator, use bolts with adequate size and tighten them with adequate torque.

Tightening the screws with a higher torque than the maximum may cause malfunction, whilst tightening with a lower torque can cause the displacement of the mounting position or fall.

Side support mounting

Side support
Mounting number: N
(MY-S50A)



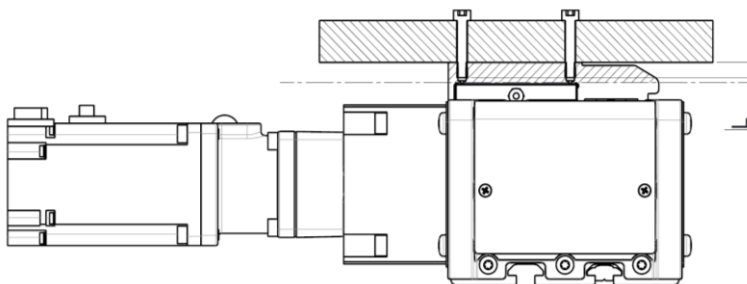
Note) Number of side supports installed: N is the total number of left and right.

Stroke	Bolt size	Maximum tightening torque [N·m]	L1 [mm]	Mounting quantity	
				80	100
~600	M8x1.25	12.5±10%	15	6	8
~900				8	10
~1200				10	12
~2000				12	14
~3000				14	16

*Fix the support interval (L) of the side support at equal intervals.

*Please use MY-S50A for the side support used for installation.

Workpiece mounting



Size	Bolt size	Maximum tightening torque [N·m]	L (Maximum screw-in depth) [mm]
80	M5x0.8	3±10%	9
100	M8x1.25	12.5±10%	15

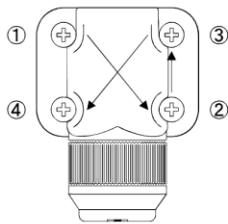
- 9. Do not operate by fixing the table and moving the actuator body.**
- 10. Vibration may occur during operation, this could be caused by the operating conditions. If it occurs, adjust response value of autotuning of driver to be lower. During the autotuning noise may occur, the noise will stop when the tuning is complete.**
- 11. When the fluctuation of load is caused during operation, malfunction/noise/alarm may occur.(In case of AC servo motor)**
The tuning of gain may not suit for fluctuation load. Adjust the gain properly by following the manual of driver.
- 12. When lifting the product, be careful not to overturn or drop it.**
Doing so may damage the product.

Plug and unplug Cable

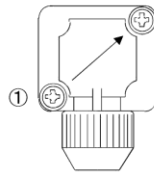
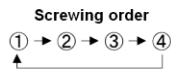
Caution

1. Let each cable insert to connector. (Cable installation)

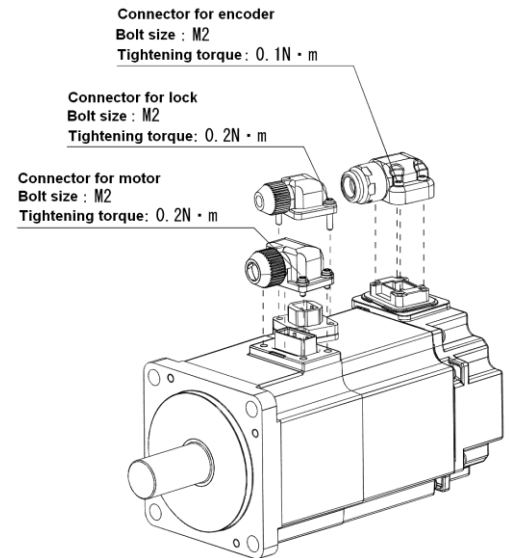
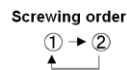
When screwing the connector, gradually tighten the screws in a crisscross pattern.



Connector for motor
Connector for encoder



Connector for lock



2. Let each cable remove the connector. (Cable removal)

Precaution on maintenance

Warning

1. Turn off the power supply and remove the workpiece before maintenance and replacement of the product.

[Maintenance frequency]

Perform maintenance according to the table below.

Contact SMC if any abnormality is found.

Frequency	Visual appearance check	Internal check	Belt check
Inspection before daily operation	○	/	/
Inspection every six months / 1000km / 5million cycle *	○	○	○

*Whichever occurs first.

[Items for visual appearance check]

1. Loose screws. Abnormal dirt.
2. Check of flaws/faults and cable connections.
3. Vibration, noise.

[Items for internal check]

1. Lubricant condition and dirt on moving parts.
For lubrication, use lithium grease No. 2.
2. Loose or mechanical play in fixed parts or fixing screws.

[Items for belt check]

Stop operation immediately when the belt appears to be like malfunction shown in the pictures below. If it occurs in the first stage of use, confirm it is within the range of the product specification, the system requirements and conditions of use.

Return the actuator to SMC for the belt to be replaced.

(When replacing the belt, please contact SMC for the instruction manual.

Adjustment of the motor origin and adjustment of the belt tension etc. is difficult.

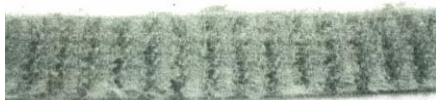
Therefore, we recommend returning the actuator to SMC for the belt to be replaced.)

a. Wear-out of tooth shape canvas

Canvas fiber becomes fuzzy.

Rubber is removed and the fiber becomes whitish.

Lines of fiber become unclear.



b. Peeling off or wearing of the side of the belt

Belt corner becomes round and frayed threads stick out.



c. Belt partially cut

Belt is partially cut.

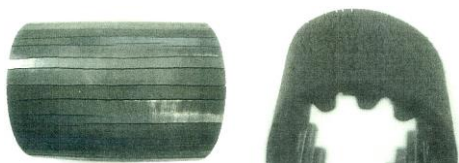
Foreign matter is caught in the teeth other than the cut part causes flaw.

d. Vertical line of belt teeth

Flaw, which is made when the belt runs on the flange.

e. The rubber back of the belt is softened and sticky.

f. Crack on the back of the belt



Belt tension adjustment method

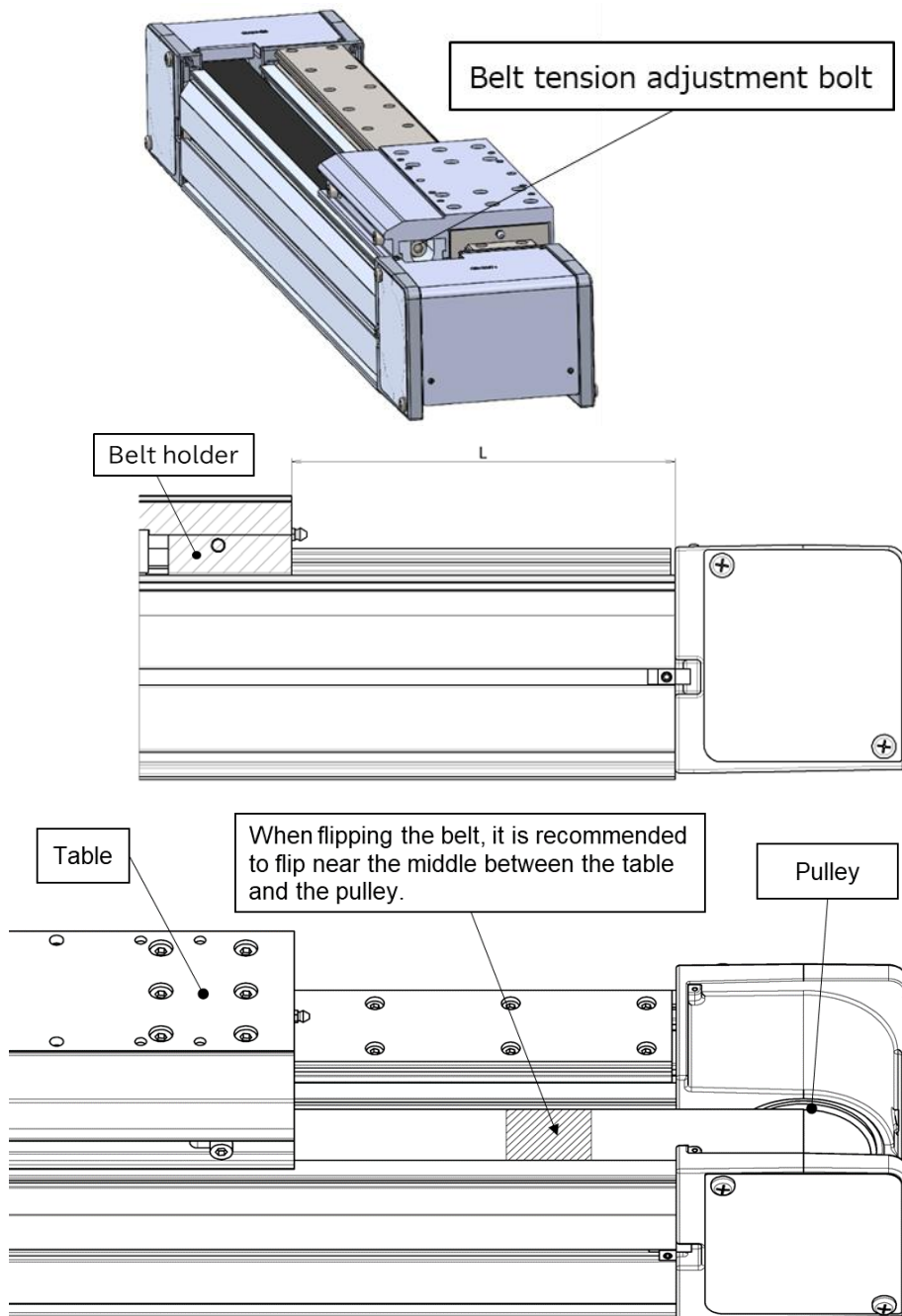
Turn the belt tension adjustment bolt clockwise to tighten the belt.

When checking the belt tension using a sonic tension meter, move the table to the measurement position L, enter the set value of the measurement position and tension setting items in Table1 to the tensiometer, and measure by flipping the belt.

When flipping the belt, it is recommended to flip it near the middle of the table and pulley and near the center of the belt width.

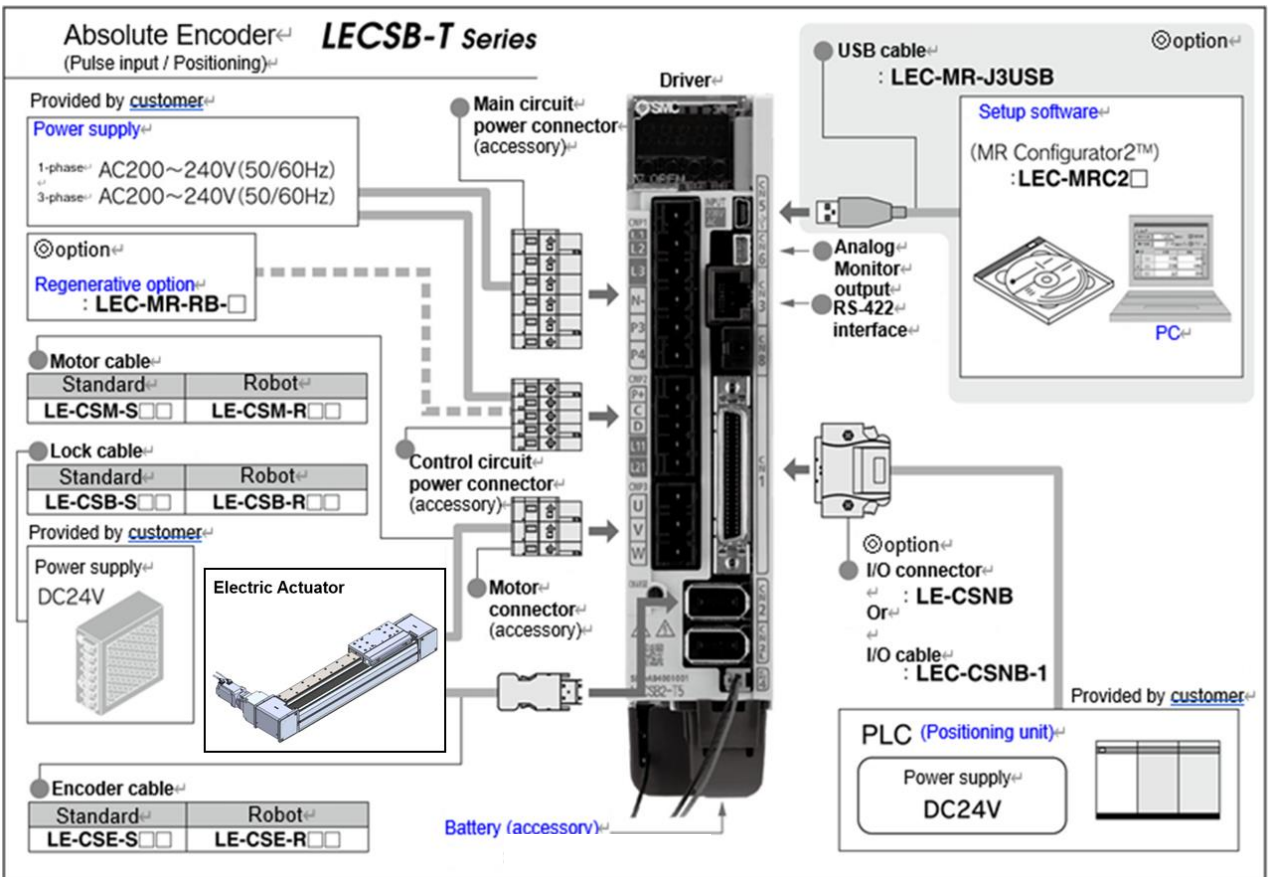
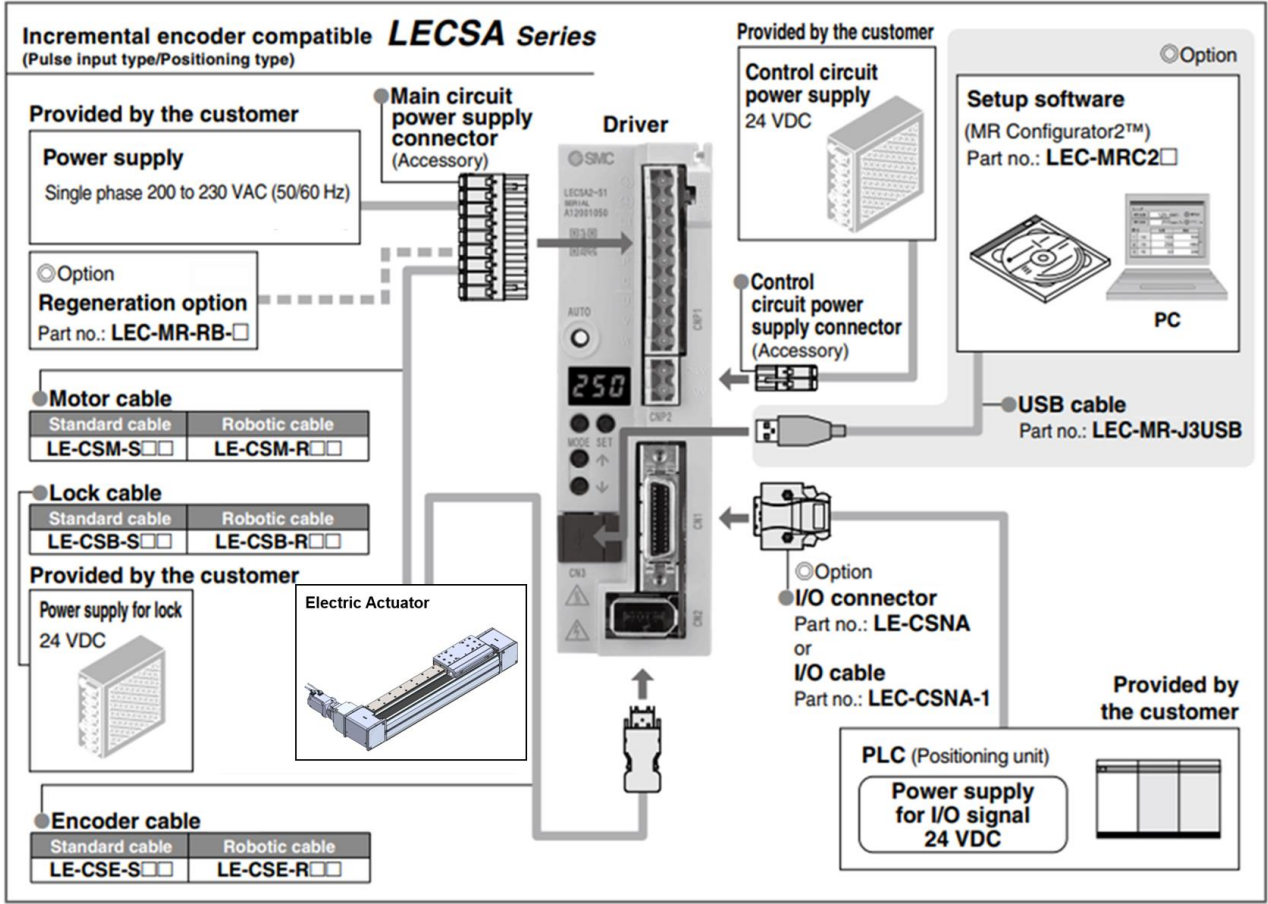
Table1. Measurement position and tension setting items

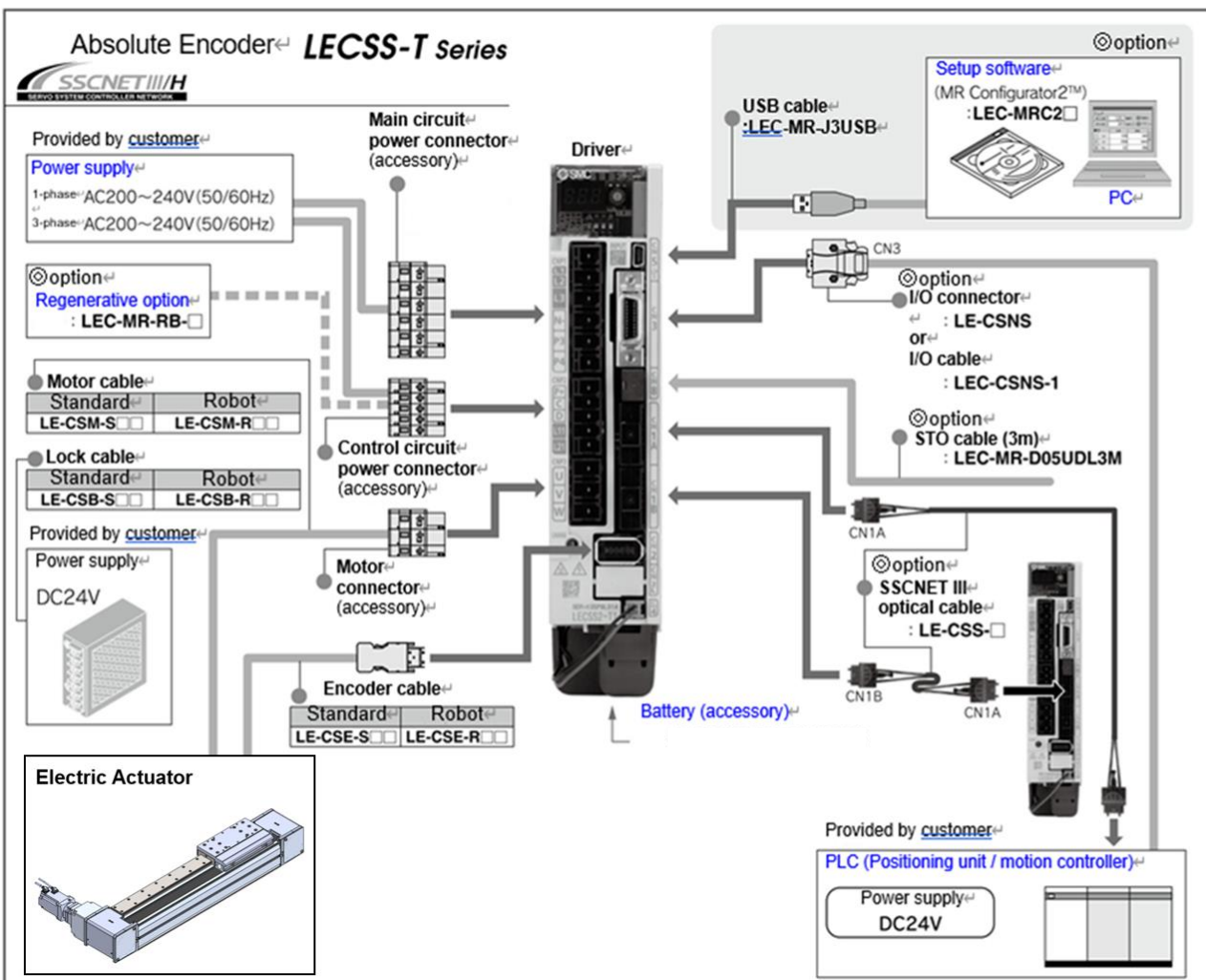
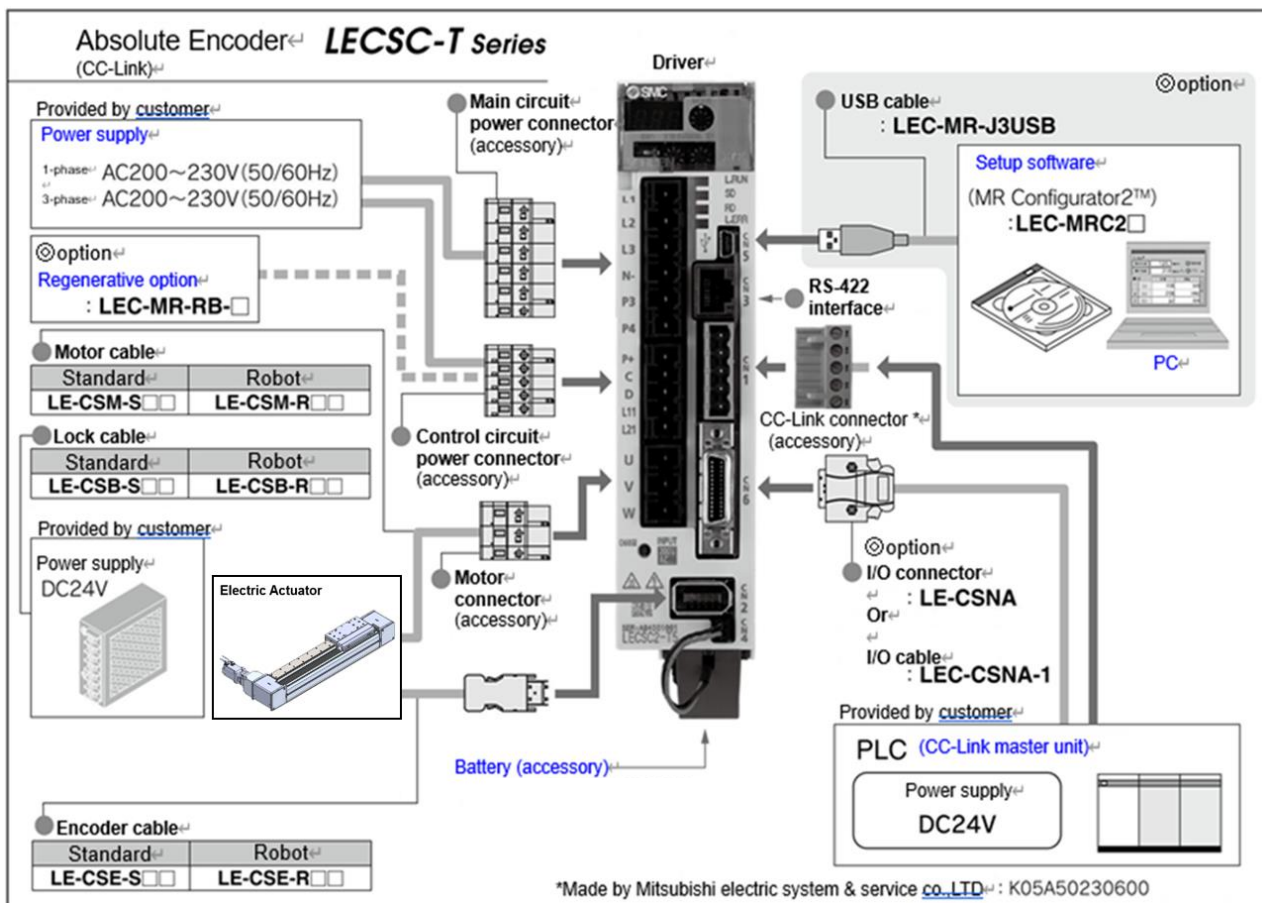
Size	Measurement position L[mm]	Tensiometer setting items			Belt tension [N]
		Belt width [mm]	Span [mm]	Unit mass [g/m]	
80	101	30	150	4.0	774±4%
100	225	50	300	4.5	2210±2%

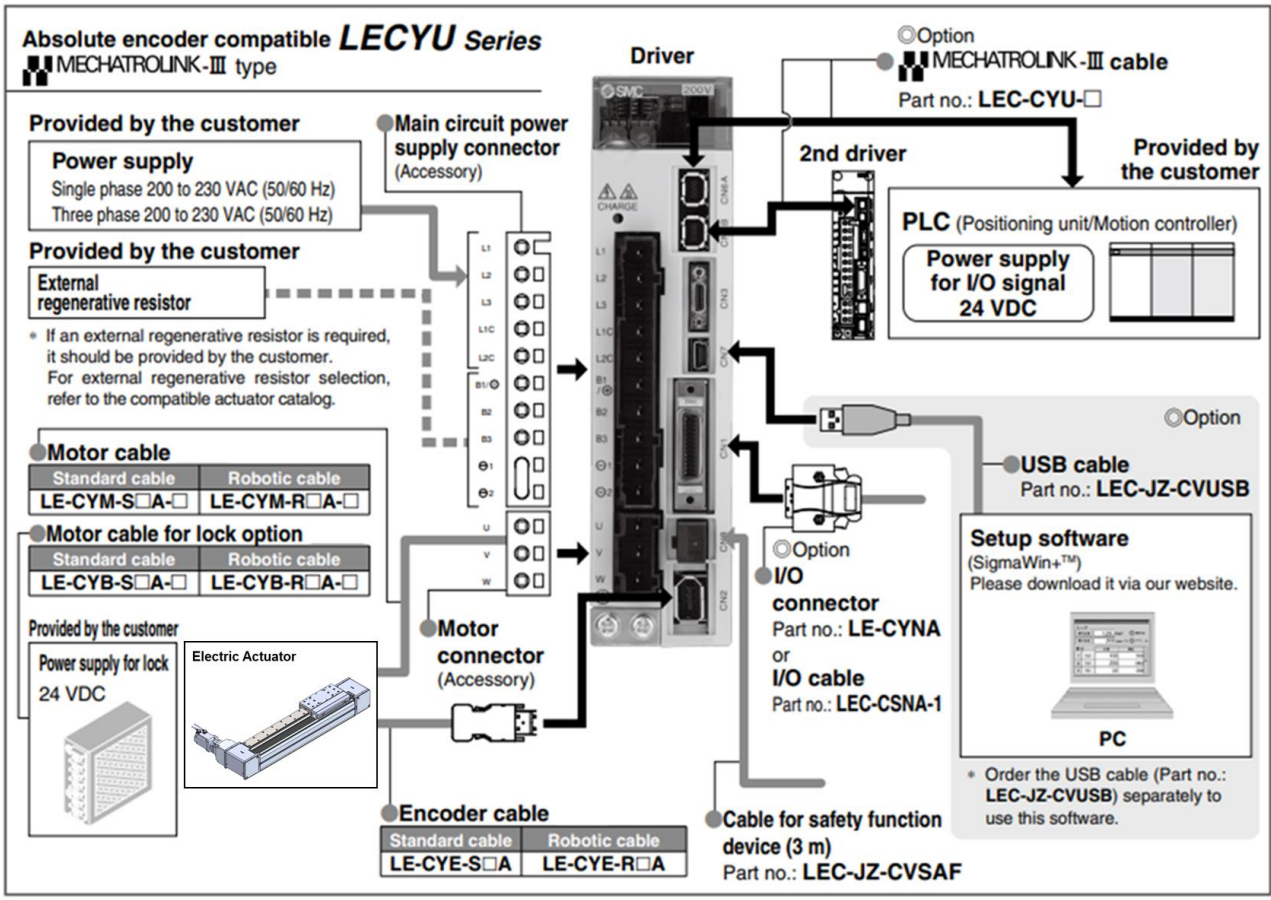
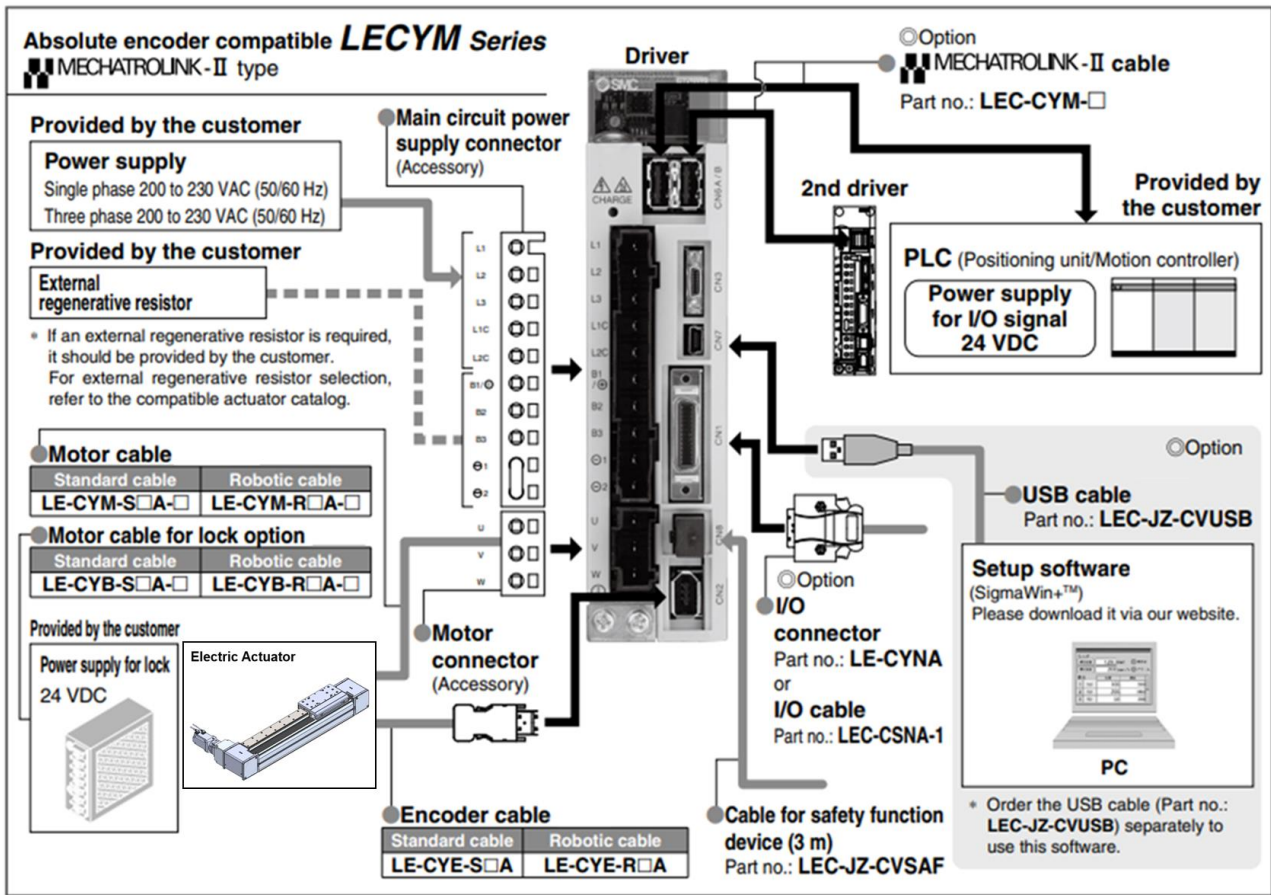


1. Product Outline

1.1 System construction







1.2 Features

Features of the electric actuator.

- **Large payload/Vertical transport possible**

A maximum of 240 kg horizontally and a maximum of 70 kg vertically can be transported.

- **Long life**

No belt replacement required up to nominal life.

- **Light weight**

In the same stroke, it is less than 90% of the competition.

- **Auto switch can be mounted**

Compatible with solid state auto switch D-M9 series.

- **Good maintainability**

The structure makes it easy to replace the belt.

Caution

When actually launching a device or a failure, please also check the operation manual such as configuration software other than this book. Store this book in a place where you can read it immediately as needed.

Function / Control mode

The following control mode can be selected for applicable drivers.
Refer to the “Driver Operation Manual” about wiring and parameter setting.

Table1-1. Applicable control mode

Driver	Control mode ^{Note1)}	Encoder	Positioning		Parameter select
	Position control		Point table method	Program method ^{Note3)}	
LECSA (Pulse input / positioning)	Pulse train	Incremental	ON/OFF signal 3 points (max. 7 points) ^{Note2)}	ON/OFF signal 4 programs (max. 8 Programs) ^{Note2)}	PA01
LECSB-T (Pulse input / Positioning)	Pulse train	Absolute	ON/OFF signal 15 points (max. 255 points) ^{Note2)}	ON/OFF signal 16 programs (max. 256 Programs) ^{Note2)}	PA01
LECSA-T (CC-Link)	CC-Link (When 2 stations are occupied)	Absolute	CC-Link 31 points(When 1 station is occupied) 255 points(When 2 stations are occupied)	-	PC30
LECSA-T (SSCNET III/H)	SSCNET III/H	Absolute	-	-	Note4)
LECYM (MECHATROLINK-II)	MECHATROLINK-II	Absolute	-	-	Note4)
LECYU (MECHATROLINK-III)	MECHATROLINK-III	Absolute	-	-	Note4)
Operation method	Positioning operation	-	Positioning operation by point table No. setting	Positioning operation by program No. setting	-

Note1) Only the position control can be used.

Note2) To set the maximum value for the each method, it is necessary to change the setting.
Please refer “Driver Operation Manual”.

Note3) The MR Configurator is necessary to control by the program method.
Order separately.

-MR Configurator2™ (Setup software Japanese version) / LEC-MRC2

-MR Configurator2™ (Setup software English version) / LEC-MRC2E

-MR Configurator2™ (Setup software Chinese version) / LEC-MRC2C

-USB cable for Setup software (3m) / LEC-MR-J3USB

Note4) It is set by upper positioning unit or motion unit.

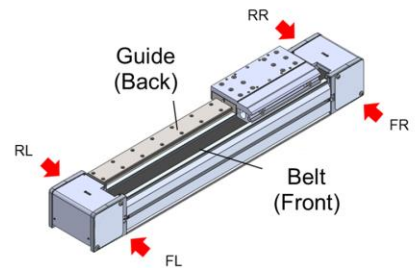
1.3 How to Order

How to order is shown below.

LET 100 FR T9 D - 300 - S 2 B2 - X11

80											Size	
100											Size	
No symbol ^{1,2}	None									*The motor can be selected from 4 positions on the left and right, with the belt side facing the front and the guide side facing the back.		Motor arrangement
FR	Front Right											Motor type
FL	Front Left											
RR	Rear Right											
RL	Rear Left											
Code			Motor type	Output[W]	Size	Supported driver					Motor type	
NN			Motorless	-	80	-						
S4			AC servo motor (Increment encoder)	400	80	LECSA2-S4						
T8			AC servo motor (Absolute encoder)	400	80	LECSB2-T8 LECSC2-T8 LECSS2-T8						
V8			AC servo motor (Absolute encoder)	400	80	LECYM2-V8 LECYU2-V8						
T9			AC servo motor (Absolute encoder)	750	100	LECSB2-T9 LECSC2-T9 LECSS2-T9						
Code			LET80	LET100	Reduction ratio							Lead [mm] (Reduction gear type)
S ^{1,2}			130	240	-							
D			43.33	80	1/3							
L			26	48	1/5							
M			14.44	26.67	1/9							
N			-	16	1/15							
300~3000			*For details, refer to the stroke correspondence table.								Stroke [mm]	
No symbol ¹			: No lock									Motor option
B			: with lock									
No symbol ¹			No cable	*Cables include a motor cable and an encoder cable. (A lock cable is also included if a motor option with lock is selected.)								Cable type
S			Standard cable									
R			Robot cable									
Code			Cable length [m]	Motor type				*The selectable length varies depending on the motor type. *The shape of the cable differs depending on the motor type.				Cable length
No symbol ¹			No cable	S4/T8/T9	V8	NN						
2			2	●	●	●						
3			3	-	-	-						
5			5	●	●	-						
A			10	●	●	-						
C			20	-	-	-						
Driver type		Compatible controller	Power-supply voltage[V]	Motor type				Driver type				
No symbol ¹		No driver	200~230	S4	T8/T9	V8	NN					
A2		LECSA2-S4/Pulse input (Increment encoder)	200~230	●	-	-	-					
B2		LECSB2-T8/Pulse input (Absolute encoder)	200~240	-	●	-	-					
C2		LECSC2-T8/CC-Link (Absolute encoder)	200~230	-	●	-	-					
S2		LECSS2-T8/SSONETM (777) (Absolute encoder)	200~240	-	●	-	-					
M2		LECYM2-V8/MECHATROLINK-II (Absolute encoder)	200~230	-	-	●	-					
U2		LECYU2-V8/MECHATROLINK-III (Absolute encoder)	200~230	-	-	●	-					
No symbol ¹			No cable	*If "No driver" is selected for the driver type, Only "No symbol: No cable" can be selected.				I/O cable				
H			No cable (connector only)									
I			1.5[m]									

80	No symbol	NN	S	-	300	No symbol	No symbol	No symbol	No symbol	No symbol
100	FR	S4	D	?	3000	B	S	2	A2	H
	FL	T8	L				R	3	B2	
	RR	V8	M					5	C2	
	RL	T9	N					A	S2	
								C	M2	
									U2	



Stroke correspondence table ●:Standard support

Size	Stroke [mm]										Manufacturable range			
	300	400	500	600	700	800	900	1000	1200	1500		2000	2500	3000
80	●	●	●	●	●	●	●	●	●	●	●	●	●	300~3000
100	●	●	●	●	●	●	●	●	●	●	●	●		

*1 Motor type: Fixed to this symbol when NN is selected.
*2 Motor type: Only NN can be selected.

1.4 Specification

LET80-100-X11 AC servo motor (400W / 750W)

Specification (with motor)

Model		LET80*(S4/V8/T8)			LET100*T9				
Actuator specification	Stroke [mm] ^{Note1)}	300~1000(Every 100st), 1200, 1500~3000(Every 500st)			300~1000(Every 100st), 1200, 1500~3000(Every 500st)				
	Work load[kg]	Horizontal	15	45	75	1.5	25	100	240
		Vertical	10	21	40	1.5	15	40	70
	Speed[mm/s] ^{Note2)}	2160	1300	720	4000	2400	1330	800	
	Maximum acceleration / deceleration [mm/s ²]	20000							
	Positioning repeatability[mm]	±0.08							
	Reduction ratio	1/3	1/5	1/9	1/3	1/5	1/9	1/15	
	Lead[mm]	43.33	26	14.44	80	48	26.67	16	
	Impact / Vibration resistance[m/s ²] ^{Note3)}	50/5							
	Drive method	Belt							
	Guide type	Liner guide							
	Static permissible moment [N/m] ^{Note4)}	Pitching	380			1157			
		Yawing	380			1157			
		Rolling	114			529			
	Operating temperature range[°C]	5~40							
Operating humidity range[%RH]	90 or less (No condensation)								
Regenerative option	It may be required by speed and work load. Refer to catalog.								
Enclosure	IP20								
Motor output[W]/Size[mm]	400/□60			750/□80					
Type of Motor	AC servo motor (AC200V)								
Encoder ^{Note5)}	Motor type S4:Incremental 17bit encoder (Resolution:131072 p/rev)			Motor type T9:Absolute 22bit encoder (Resolution:4194304 p/rev)					
	Motor type T8:Absolute 22bit encoder (Resolution:4194304 p/rev) (For LECSB2-T□, LECS2-T□)			Motor type T9:Absolute 18bit encoder (Resolution:262144 p/rev) (For LECS2-T□)					
	Motor type T8:Absolute 18bit encoder (Resolution:262144 p/rev) (For LECS2-T□)			Motor type T9:Absolute 18bit encoder (Resolution:262144 p/rev) (For LECS2-T□)					
	Motor type V8:Absolute 20bit encoder (Resolution:1048576 p/rev)								
Power[W] ^{Note6)}	Maximum power 1275			Maximum power 1100					
Type ^{Note7)}	No excitation operating type								
Holding force [N]	153	255	458	153	255	458	763		
Power consumption [W] at 20°C[W] ^{Note8)}	Motor type S4:7.9 Motor type T8:7.9 Motor type V8:6.0			Motor type T9:10					
Rated voltage [VDC]	DC24 ⁰ / _{-10%}								

Note 1) Non-standard strokes are available as special orders, so please contact us.

Note 2) For details, refer to the "Speed - Work load graph (reference)" in the catalog.

Note 3) Impact resistance... No malfunction in the belt feed direction and perpendicular direction in the drop impact test (values at the initial stage).

Vibration resistance... 45 to 2000 Hz 1 sweep, no malfunction in the belt feed direction and perpendicular direction (value at the beginning).

Note 4) The static permissible moment is the static moment applied when the actuator is stopped.

If there is a shock or a repeated load, please use it with sufficient safety in mind.

Note 5) The resolution changes depending on the driver type.

Note 6) Indicates the maximum power during operation including the driver. When selecting the power supply capacity, refer to the power supply capacity in the instruction manual for each driver.

Note 7) Only when the motor option "with lock" is selected.

Note 8) When selecting "with lock", add the power consumption.

Note 9) Do not let it collide with both ends of the table movement range.

Also, when performing positioning operation, do not command a range of [LET80:22mm,LET100:25mm] from both ends.

Note 10) Please contact us for manufacturing intermediate strokes. (Manufacturing range: LET80/300-3000mm,LET100/300-3000mm)

Note 11) The sensor magnet position is the table center position.

Specification (without motor)

Model		LET80NN	LET100NN	
Actuator specification	Stroke[mm]	300~1000(Every 100st),1200 1500~3000(Every 500st)	300~1000(Every 100st),1200 1500~3000(Every 500st)	
	Work load[kg]	Horizontal	75	240
		Vertical	70	200
	Speed[mm/s]	5000		
	Maximum acceleration / deceleration [mm/s ²]	50000		
	Positioning repeatability[mm]	±0.08		
	Lead[mm]	130	240	
	Impact / Vibration resistance[m/s ²]	50/5		
	Drive method	Belt		
	Guide type	Liner guide		
	Static permissible moment [N/m]	Pitching	380	1157
		Yawing	380	1157
		Rolling	114	529
	Operating temperature range[°C]	5 to 40		
	Operating humidity range[%RH]	90 or less (No condensation)		
Enclosure	IP20 (exclude motor mounting part)			

Actuator mass [kg]

Size	Stroke[mm]												
	300	400	500	600	700	800	900	1000	1200	1500	2000	2500	3000
80	14.1	15.8	17.5	19.0	20.7	22.4	23.9	25.6	28.9	33.8	42.0	50.2	58.4
100	36.5	39.3	42.3	45.1	47.9	50.8	53.8	56.6	62.3	70.9	85.3	99.7	114.1

Additional mass of motor [kg]

Motor type	Lead[mm]				Additional mass with lock [kg]
	D	L	M	N	
S4,T8	3.2	4.4	4.4	-	0.4
V8	3.1	4.3	4.3		0.6
T9	7.4	7.4	8.7	9.1	1.0

In the case of a motorless type, only the mass of the actuator unit is used, and in the case of a motor type, the mass of the actuator unit plus the motor unit mass is used.

Example)

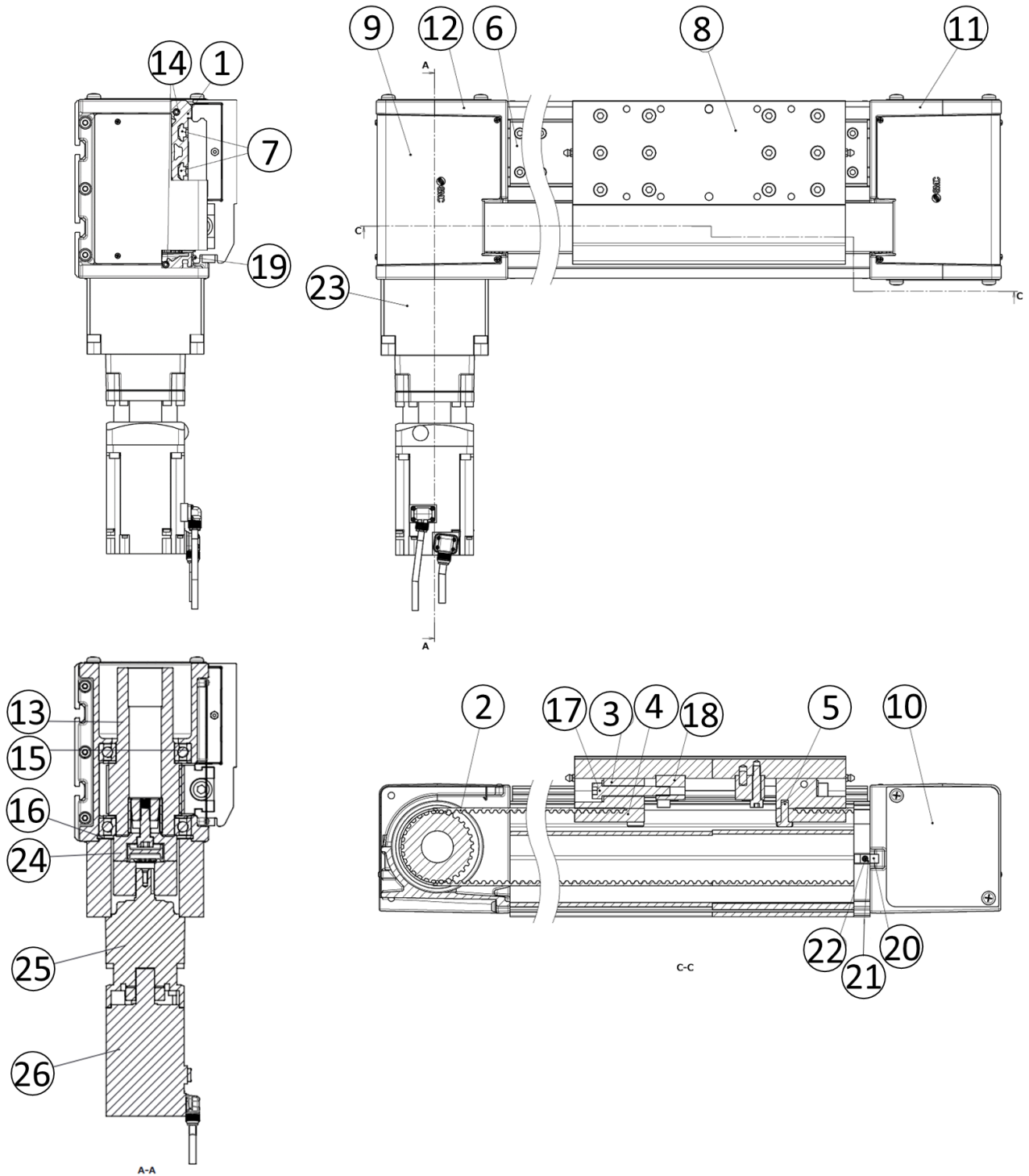
LET80NN-300 : 14.1[kg]

LET80S4D-300 : 14.1+3.2[kg]

LET80S4D-300B : 14.1+3.2+0.4[kg]

1.5 Construction

LET-X11



No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Belt	-	-
3	Belt clamp plate	Carbon steel	Chromate coating
4	Belt holder	Aluminum alloy	Anodized
5	Slip fit bolt	Carbon steel	Nickel plating
6	Linear guide Ass'y	-	-
7	T-nut rail	Carbon steel	-
8	Table	Aluminum alloy	Anodized
9	Housing cover	Aluminum alloy	Anodized
10	Side cover	Aluminum alloy	Anodized
11	Housing C	Aluminum die-casting	Painting
12	Housing D	Aluminum die-casting	Painting
13	Pulley shaft	Carbon steel	Chromate coating

No.	Description	Material	Note
14	Spring pin	Carbon steel	-
15	Bearing	-	-
16	Retaining ring	Spring steel	Phosphate coating
17	Belt tension adjustment bolt	Carbon steel	Chromate coating
18	Table block	Carbon steel	Chromate coating
19	Magnet	-	-
20	Auxiliary bracket A	Aluminum alloy	-
21	Auxiliary bracket B	Carbon steel	-
22	Set screw	Steel in general	Chromate coating
23	Speed reducer flange	Aluminum alloy	Anodized
24	Coupling	-	-
25	Decelerator	-	-
26	Motor	-	-

2. Procedure before operation

2.1 Preparation

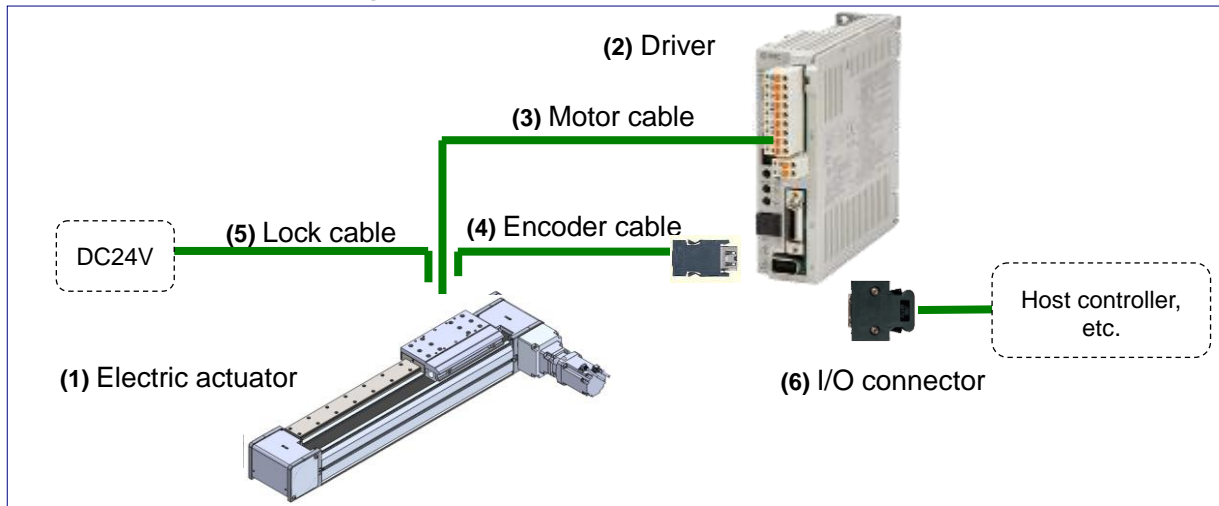
Items to be prepared

Please check on the label, and the quantity of accessories, to confirm that it is the product that was ordered.

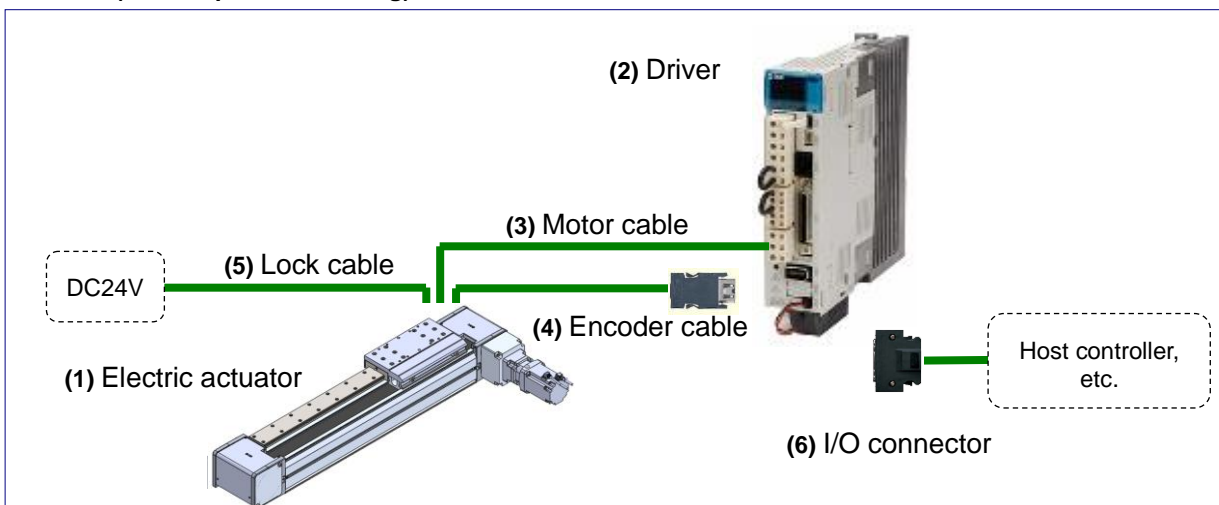
Table2-1. Components

No.	Part name	Quantity
(1)	Electric Actuator / LET-X11 Series	1
(2)	Driver / LEC Series	1 (in case with driver)
(3)	Motor cable	Pre-installed (1) (in case with cable)
(4)	Encoder cable	
(5)	Lock cable	
(6)	I/O Connector	1 (in case with I/O connector)

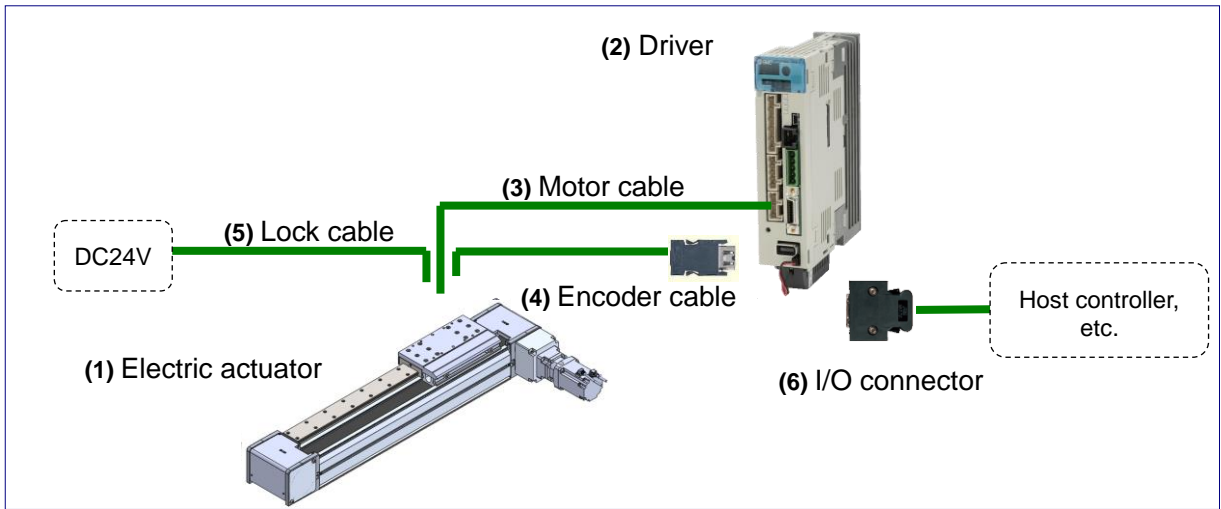
LECSA (Pulse input / Positioning)



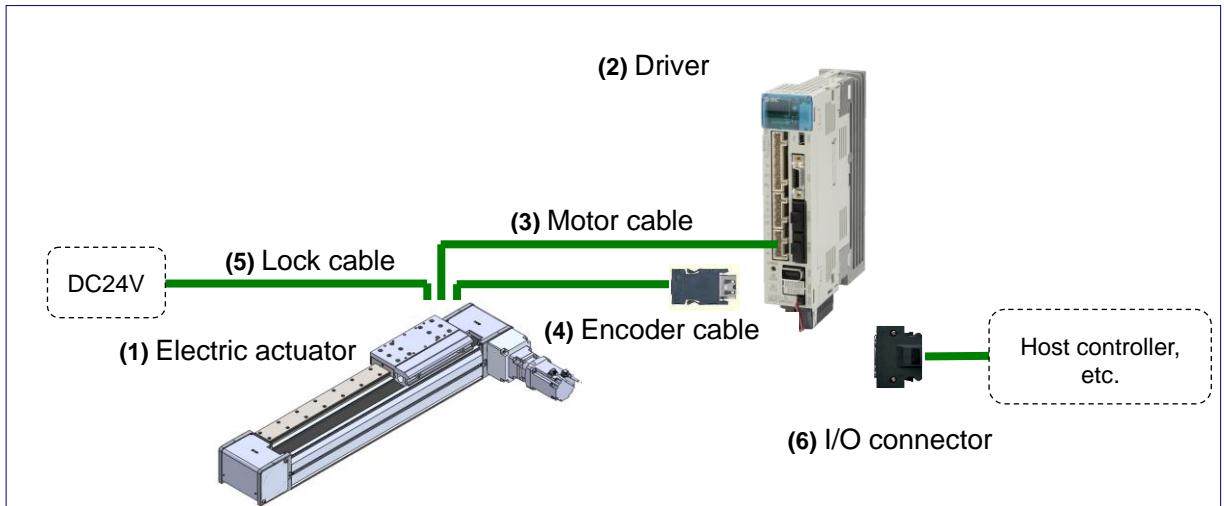
LECSB-T (Pulse input / Positioning)



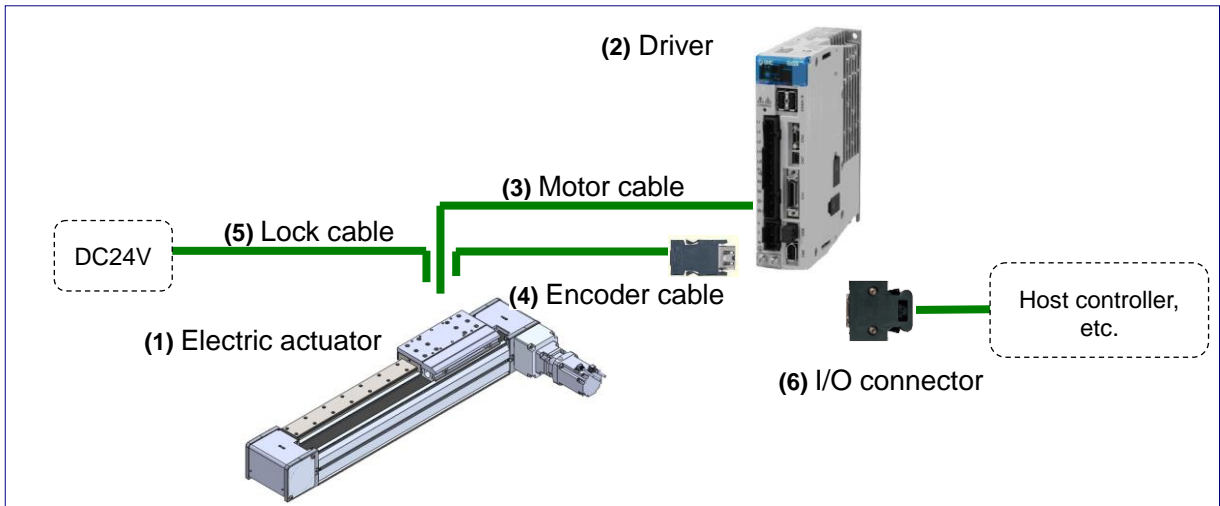
LECSC-T (CC-Link)



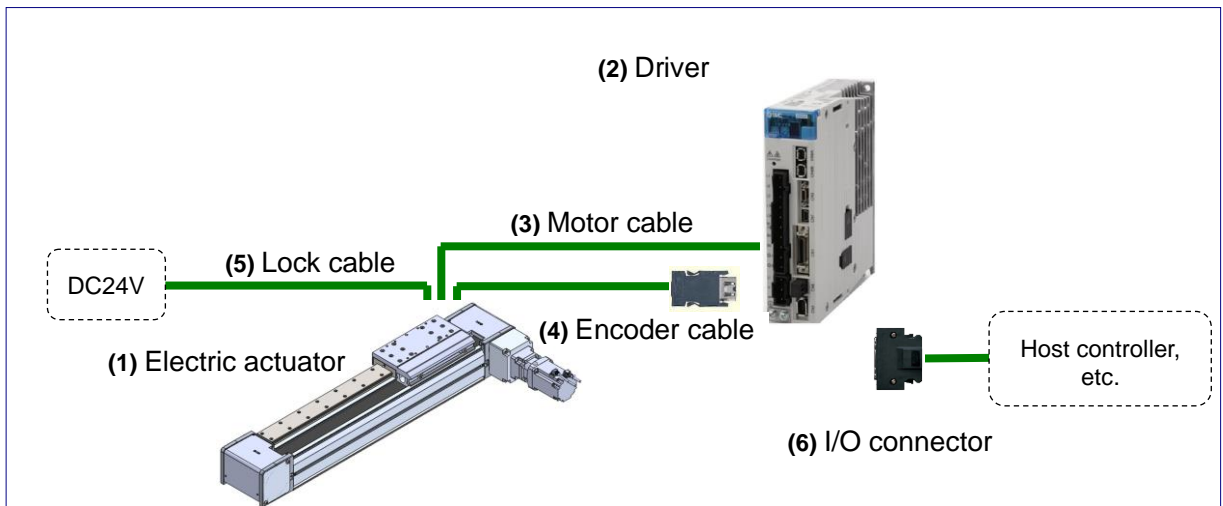
LECSS-T (SSCNET III / H)



LECYM (MECHATROLINK-II)



LECYU (MECHATROLINK-III)



For installation and wiring, refer to the operation manual for each driver.

2.2 Installation of electric actuators

Install the electric actuator at the installation location using the following method.

Mounting

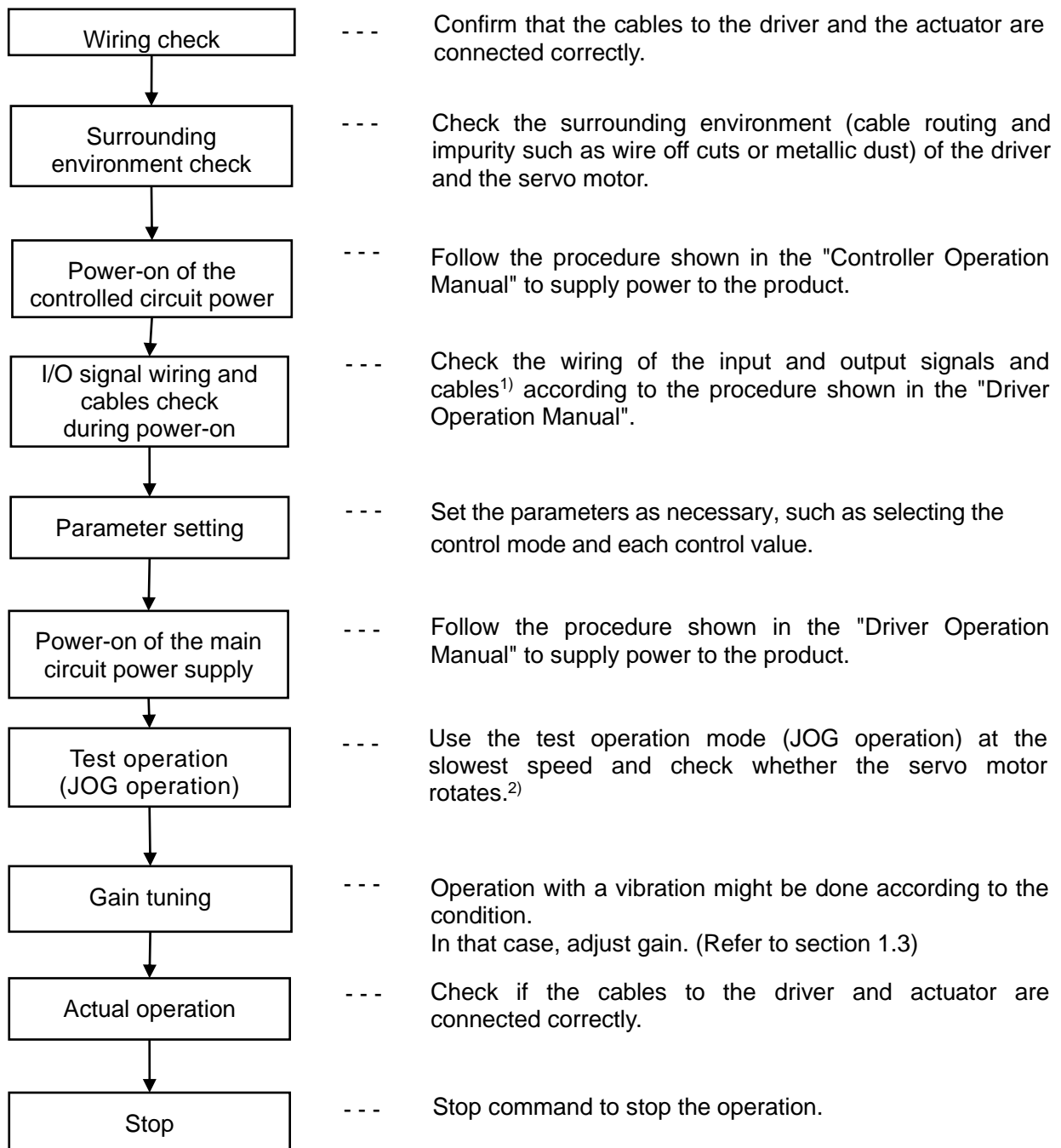
Regarding the bolts and tightening torque to be used for mounting the workpiece/jig and mounting the main unit, please refer to "8. When mounting the actuator, use bolts with adequate length and tighten them with adequate torque."

Caution

M4 screw, the cable with crimped terminal and toothed washer must be prepared by the user.
The actuator must be connected to Ground to reduce noise. If further noise resistance is required, consider measures such as grounding 0V (signal ground).
When grounding the 0V, avoid flowing noise from the ground to the 0V.

2.3 Startup

When switching the power on for the first time, follow the startup procedure below.
Refer to the "Driver operation manual" for wiring method and detailed procedure.



2.4 Gain tuning

Procedure

Here are the steps for basic gain tuning.

Refer to the “Driver operation manual” for details and for tuning methods other than shown below.

Warning

A mechanical resonance may occur depending on the configuration or the mounting orientation of the transferred object. Please change the appropriate parameter in the initial setting. Refer to the “Driver operation manual / APPENDIX / Recommended parameter values for each actuator” for the parameter.

3. Troubleshooting

When a fault occurs during the operation, the corresponding alarm or warning is displayed.

If any alarm or warning has occurred, refer to 「Driver Operation Manual」and take the appropriate action.

Revision history

August 2023 : Frist edition
October 2023 : Revision

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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