



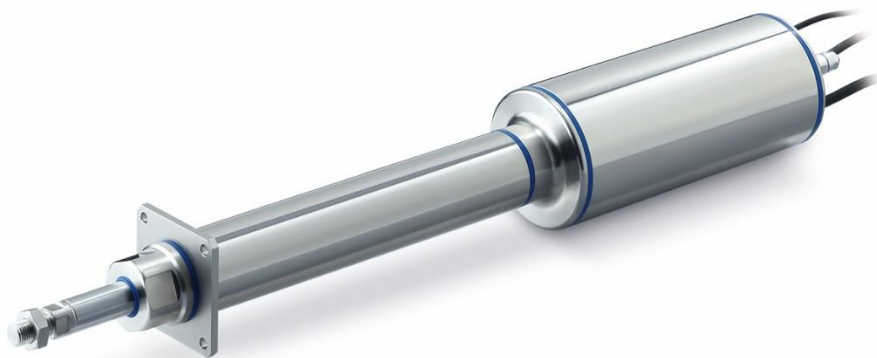
Operation Manual

PRODUCT NAME

**Electric Actuator / Rod Type
Dust-tight / Water-jet-proof (Enclosure IP69K)
(AC Servo Motor 100W/200W/400W)**

MODEL / Series / Product number

HF2A-LEY 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.

* For details on the vent hole, please also check the operation manual for the “KFG2H□-E” series of EHEDG compliant fittings.

SMC Corporation

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Electric Actuator / Rod Type 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.



Electric Actuator / Rod Type 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. **When repeated bending of the actuator cable is required, do not put cables into a flexible moving tube with a radius smaller than the specified value.**
Refer to the robot cable in 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.) can apply excessive voltage or current to the product causing damage.
10. **When checking the conductivity of the cable, be careful not to deform the connector's mating hole and terminals.**
Inserting a non-compatible connector, tool, cylinder-shaped object, etc., into the connector's mating hole can cause the mating hole or terminals to become deformed, which may cause contact failure or disconnection.
11. **Refrain from plugging in and unplugging the connector frequently.**
Doing so may result in contact failure or disconnection.
12. **Do not connect wires while the power is ON.**
It may cause the electric actuator or its peripheral devices to be damaged, causing a malfunction.

[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. Do not use the stop signal as the emergency stop of the system.**
Stop by shutdown of main circuit power supply is for stopping the electric actuator with deceleration. For the emergency stop of the equipment, design the system with a separate emergency stop circuit conforming to relevant safety standards.
- 10. Do not exceed the product specifications even if a work load is supported by external guides.**
Although the Electric actuator moment is reduced by the external guides, the required trans- port ability (the relationship between the speed and the work load) is not reduced.
- 11. In order to prevent danger and damage due to the breakdown and the malfunction of this product, which may occur at a certain probability, a backup system should be established in advance by giving a multiple-layered structure or a fail-safe design to the equipment, etc.**
- 12. Avoid designing a system that allows the driving part of an electric actuator to operate with a spring or other external force.**

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 or more a day or every 1000 strokes.**
Otherwise, lubrication may run out.

- 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.

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 connecting, make sure the rod axis and the load, and the direction of the movement match.**

Failure to do so may cause complications with the lead screw, such as wear or damage.
- 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. 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.
- 7. Do not use in cantilevered fixation.**

When the actuator is operated at high speed while it is fixed at one end and free at the other end, a bending moment may act on the actuator due to vibration generated at the stroke end, which can damage the actuator. Be sure to secure both sides with our mounting supports. Be sure to secure both sides with our mounting supports.
- 8. 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.
- 9. Maintenance space**

Allow sufficient space for maintenance and inspection.
- 10. The electric actuator and its peripheral devices should be installed on a fire-proof material.**

Direct installation on or near a flammable material may cause a fire.
- 11. Do not install the product in a place subject to vibrations and impacts.**

It will cause failure or malfunction.
- 12. Take measures to ensure that the operating temperatures of the electric actuator and its peripheral devices are within the range of the specifications. also, should be installed with 50mm or larger spaces between each side of it and the other structures or components.**

It may cause a malfunction of the controller and its peripheral devices and a fire.
- 13. Do not mount the controller and its peripheral devices near a large electromagnetic contactor or no-fuse breaker which generates vibration on the same panel. Mount them on different panels or keep the controller and its peripheral devices away from such a vibration source.**
- 14. Install the electric actuator and its peripheral devices on a flat surface.**

If the mounting surface is distorted or uneven, an unacceptable force may be added to the housing, etc., causing problems.

Handling

Warning

- 1. Do not touch the motor while in operation.**

The surface temperature of the motor can increase to approx. 80°C due to operating conditions. Energizing alone may also cause this temperature increase. Do not touch the motor when in operation as it may cause burns.
- 2. If abnormal heating, smoking, fire, or etc., occurs in the product, immediately shut off the power supply.**
- 3. 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.
- 4. 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.
- 5. 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.**
- 6. The inside of the electric actuator and its connector should not be touched.**

It may cause an electric shock or damage to the controller.
- 7. Do not perform the operation or setting of the product with wet hands.**

Doing so may cause an electric shock.
- 8. Products with damage or those missing any components should not be used.**

An electric shock, fire, or injury may result.
- 9. Be careful not to be caught or hit by the workpiece while the electric actuator is moving.**

It may cause an injury.
- 10. Do not connect the power supply to the product before confirming the area to which the workpiece moves are safe.**

The movement of the workpiece may cause an accident.
- 11. Before installation, wiring, and maintenance, the voltage should be checked with a tester 5 minutes after the power supply has been turned off.**

Otherwise, an electric shock, fire, or injury may result.
- 12. Do not use the product in an area where a magnetic field is generated.**

It will cause failure or malfunction.
- 13. Do not install the product in an environment containing flammable gas, explosive gas, or corrosive gas.**

It could lead to fire explosion and corrosion.
- 14. Radiant heat from strong heat sources, such as a furnace, direct sunlight, etc., should not be applied to the product.**

It will cause failure of the electric actuator or its peripheral devices.
- 15. Do not use the product in an environment subject to a temperature cycle.**

It will cause failure of the electric actuator or its peripheral devices.
- 16. Do not use the product in a place where electrical surges are generated.**

When there are units that generate a large amount of surge around the product (e.g. solenoid type lifters, high-frequency induction furnaces, motors, etc.), this may cause deterioration or damage to the product's internal circuit. Avoid sources of surge generation and crossed lines.
- 17. Do not install the product in an environment under the effect of vibrations and impacts.**

It will cause failure or malfunction.
- 18. When a surge-generating load, such as a relay or solenoid valve, is driven directly, use a product that incorporates a surge protection device.**

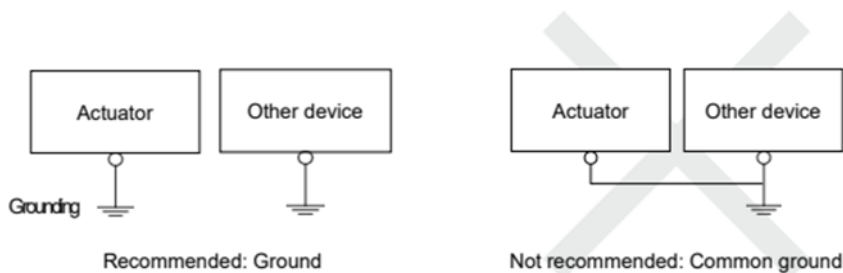
Caution

- 1. Select the driver type corresponding to the motor type.**
Driver type depends on the motor type. Please check the motor type before ordering.
- 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. Operation test should be done by low speed. Start operation by predefined speed after confirming there is no trouble.**
- 7. 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.**
Otherwise, it may cause an electric shock or fire.
- 2. Dedicated grounding should be used.**
Grounding should be to a D-class ground. (Ground resistance of 100 ohm 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.

Operating environment

Warning

1. Avoid use in the following environments.

- a. Locations where a large amount of cutting chips.
- 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, or 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 exposed to splashes of oil drops.
- h. Areas exposed to direct sunlight (ultraviolet ray).
- i. Environment at an altitude of 1000 meters or higher.
Heat dissipation and withstand voltage will decrease.

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

Play or increased sliding resistance can result.

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

4. 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.

5. 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 35 to 85%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.
- 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.**
Use specified grease for lubrication.

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 / Rod type Common precautions

Enclosure

IP69K is the degree of protection against dust and high pressure hot water washdown specified in DIN 40050-9 and currently specified in ISO 20653 and JIS D 5020.

*Test environment:

Temperature 75-85°C, water pressure 8-10MPa, flow rate 14-16L/min, four nozzle angles (0°, 30°, 60°, 90°), turntable rotating at 4-6r/min, test duration 30 seconds per surface at 10-15cm distance.

*IEC60529 specifies IP69 for general-purpose electrical products under the same conditions as IP69K except for a distance of 15-20cm. Although IP69K > IP69 as test conditions, this standard is expected to become the mainstream standard in the future since the scope has been expanded to include products for road vehicles.

Warning

1. **IP69K is only guaranteed to the factory condition.**
2. **IP69K compliant products are protected against dust and high pressure hot water washdown. However, use within the specification range of ambient temperature.**
3. **IPX9K compliant products do not protect against fluids entering the product under all conditions.**

When washing, follow the "Precaution on maintenance" section of "Rod type Common precautions".

4. **The cable, driver and breathing port tube are not IP69K compliant products.**

Take appropriate protective measures.

Design/ Selection

Caution

1. **Do not apply a load exceeding the actuator specification.**
A product should be selected based on the maximum work load and allowable lateral load on the rod end. 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 bushing, and reduced product life.
2. **Do not exceed the speed limit of the 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. This could lead to reduced accuracy and reduced product life.
3. **Do not use the product in applications where excessive external force or impact force is applied.**
This can lead to premature failure of the product.
4. **For pushing operation, use a compatible driver with pushing operation.**
Refer to the LEC□ series driver catalog for drivers compatible with pushing operation.

Handling

Caution

1. **Keep the specifications driving speed range and pushing force for pushing operation.**
This may lead to damage and malfunction.
2. **Do not hit the workpiece or the stroke end except in pushing operation.**
Perform test run to confirm that there is no hit except for pushing operation.
3. **Normal/reverse torque limit value is set to 100 % as a default.**
It is the maximum torque (the limit value) in the "position control mode", "speed control mode" or "positioning mode". When the product is operated with a smaller value than the default, acceleration when driving can decrease. Set it upon confirmation with the actual equipment used.
4. **The maximum speed of this actuator varies depending on the stroke of the product.**
When selecting a product, check the catalog for the model selection.
5. **Do not apply a load, impact or resistance in addition to a transferred load during return to origin.**
Otherwise, the origin can be displaced since it is based on detected motor torque.

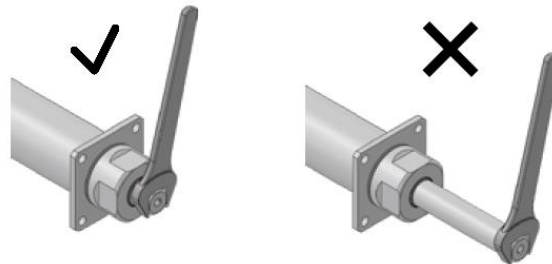
6. **Do not scratch or gouge the sliding parts of the piston rod, by striking or grasping them with other objects.**
Piston rod is manufactured to precise tolerances, so that even a slight deformation may cause malfunction.
7. **Please connect it so that the impact and load may not be added to the rod from the side when external guide is used.**
8. **Please do not operate body itself by the piston rod fixing.**
An excessive load joins the piston rod, and it causes defective operation and the longevity decrease.
9. **If the abnormal temperature of servo motor, lower the torque limit, duty ratio, ambient temperature, reduce the load or review the operation pattern.**
10. **When the actuator is operated at high speed while it is fixed at one end and free at the other end (flange 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.
11. **Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.**

If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy.

Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable Rotational Torque (Nm or less)	HF2A-LEY25**	HF2A-LEY32**	HF2A-LEY63**
	1.1	1.4	2.8

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes. Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



12. **When the fluctuation of load is caused during operation, malfunction/noise/alarm may occur.**
The tuning of gain may not suit for fluctuation load. Adjust the gain properly by following the manual of driver.
13. **Be sure to mount the tubing to the vent hole. (Applicable tube outer diameter: $\phi 8$)**
Place the end of the tubing in an area where it is not exposed to dust or water. When the actuator is used without mounting the tubing to the vent hole, water or dust may enter the inside of the actuator, resulting in a malfunction.
The fitting uses our "KFG2H0806-G02-E". Refer to the product catalog and instruction manual for precautions regarding the use of compatible tubes and fittings.
14. **In an environment where liquids other than water are splashed, it is recommended that appropriate protective measures be taken.**
15. **The motor cable, encoder cable, and lock cable are not covered by IP69K protection.**
The motor cable, encoder cable, and lock cable are covered by IP67 protection. Take measures to protect them to water pressure.
16. **The driver and the connectors on the driver side are not covered by IP protection. Take measures to protect them from water and dust.**

Operating environment

⚠ Warning

1. Do not use valves in atmospheres of corrosive gases, chemicals, sea water, water vapor, or where there is direct contact with any of these.

Check section on washing and the product component list of the external materials used, and ensure compatibility with any chemicals used in the washing solution.

2. When installing this product, do not use it in an environment where food in direct contact with this product is treated as a commodity.

Use this product in an environment where this product does not come in contact with food or where food that comes in direct contact with this product is not treated as a commodity.

Mounting

⚠ Warning

1. Install the electric actuator in an ambient temperature of 40°C or less.

This can lead to premature failure of the product.

⚠ Caution

1. Keep the flatness of mounting surface to within [0.1mm or less].

Insufficient flatness of the work piece or the surface onto which the actuator body is to be mounted can cause increased sliding resistance, noise, life time reduction.

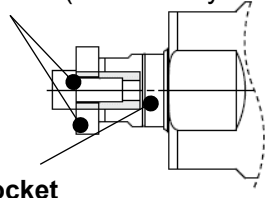
2. When mounting the workpiece or other device to the actuator tighten the fixing screws with Fix 'Socket' square width across flats in the piston rod point with the spanner etc., prevent the piston rod from rotating, and tighten the screw tightening when work piece or tool, etc. are installed properly by the torque value within the Maximum tightening torque.

It causes the space of an internal guide, and an increase of the sliding resistance, etc.

Workpiece mounting

Work fixed/ Rod end female thread

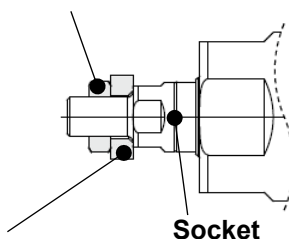
Work fixed(Provided by user)



Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth [mm]	Socket width across flats [mm]
HF2A-LEY25	M8x1.25	12.5	13	17
HF2A-LEY32	M8x1.25	12.5	13	22
HF2A-LEY63	M16x2	106	21	36

Work fixed/ Rod end male thread

Rod end nut



Model	Thread size	Max. tightening torque [N·m]	Effective thread length [mm]	Socket width across flats [mm]
HF2A-LEY25	M14x1.5	65.0	20.5	17
HF2A-LEY32	M14x1.5	65.0	20.5	22
HF2A-LEY63	M18x1.5	97.0	26	36

Work fixed(Provided by user)

Use screws with adequate length, but with a length less than the maximum thread depth.

The use of screws which are too long can touch the body and cause malfunction.

(Approximate screw length: 0.5 mm or more shorter than the maximum thread depth)

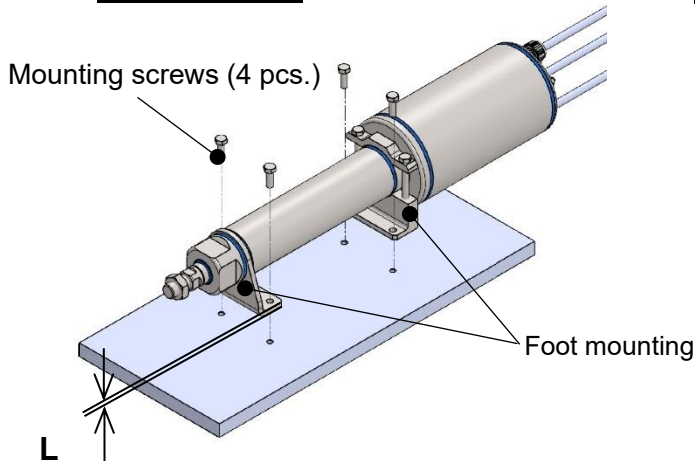
3. When mounting the actuator tighten the fixing screws with adequate torque within the specified torque range.

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 in extreme conditions detaching of the work piece.

4. When the flange mounting is used, can only be placed vertical mounting.

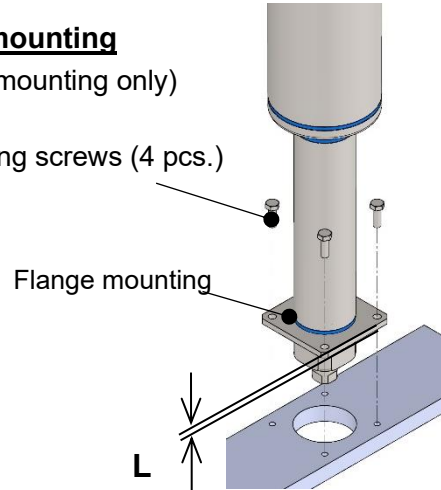
The actuator may be damaged by bending moment.

Foot mounting



Flange mounting

(vertical mounting only)



Model	Screw size	Max. tightening torque [N·m]	L[mm]	
			Foot mounting	Flange mountingg
HF2A-LEY25	M6	5.2	5	5
HF2A-LEY32	M8	12.5	6	6
HF2A-LEY63	M8	12.5	10	10

5. When installing the main unit, make sure there is enough space for the cable to bend at the specified radius.

⚠ Caution

If the mounting surface of the driver is distorted or not flat, excessive force may be applied to the housing, etc. causing malfunction.
Mount this product on a plane surface.

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	Appearance check	Grease application	Replace rod cover assembly
Inspect daily before operating	○	-	-
Inspection every one months / 100km / 500000 cycle*	○	○	-
Inspection every six months / 400km / 4million cycle*	○	○	○

*Either of inspection early time is selected.

[Items for visual appearance check]

1. Loose set screws, abnormal dirt.
2. Check of flaw and cable joint.
3. Abnormal wear, dirt, or lubrication condition of piston rod.
4. Loose or rattling of parts.
5. Dirty sealing gasket.
6. Vibration, noise.

Caution

2. Precautions for washing

The following conditions are recommended when washing this product.

-Distance from the nozzle: 15 cm or more.

-Water pressure: 8 MPa or less.

-Water temperature: 75°C or less.

-Water flow rate: 14 l/min or less.

Use the lower value in comparison with the operating conditions of the washing machine.

Do not concentrate the washing area in one spot or fix the nozzle in one spot.

Concentration of washing points on the sealing gasket area can cause deterioration and damage to the sealing gasket.



Grease application

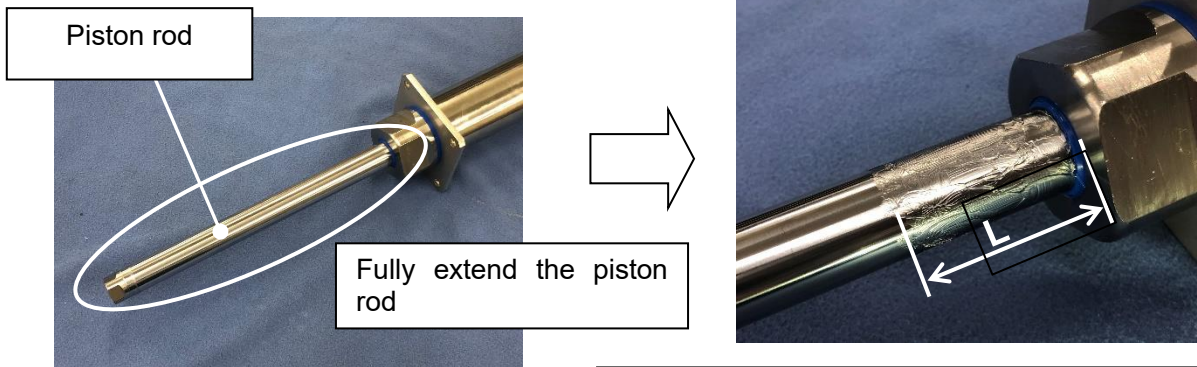
If grease lubrication performance is reduced due to operating environment or operating conditions, please reapply grease.

[Grease application]

Fully extend the piston rod by performing a JOG operation and apply grease to the base of the piston rod.

*When ordering the grease from SMC, please order a grease pack: GR-R-010

After applying grease, operate the piston rod 2 to 3 times to spread the grease evenly over the full stroke of the piston rod.



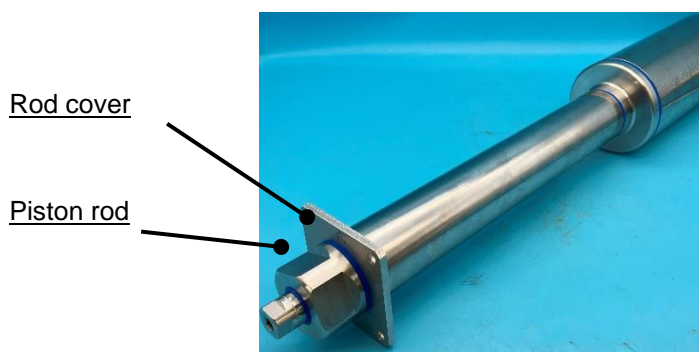
L=10 to 15mm
(per 100mm of piston stroke)
e.g.) For 200mm stroke, L = 20 to 30mm
* Apply grease evenly over the piston rod base.

Grease package No.	Note
GR-R-010	Food-grade grease (10g)

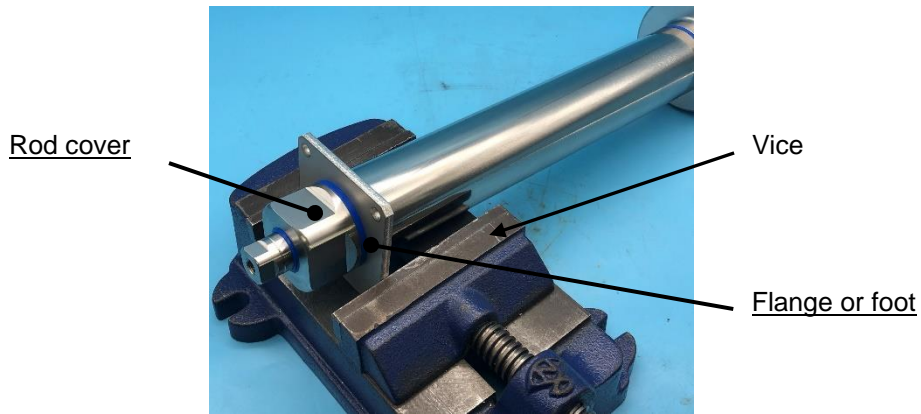
Model	Amount of grease (g/stroke per100mm)
LEY25	0.6
LEY32	0.7
LEY63	1.1

Replace rod cover assembly

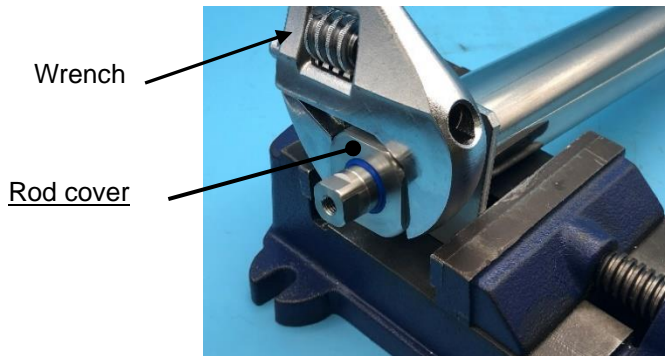
1. Fully contract the piston rod by performing a JOG operation.
2. Remove the workpiece from the electric actuator.
3. Turn off the power supply.
4. Remove the electric actuator from the frame.



5. To hold the electric actuator, clamp the side of the flange or foot in the vice. The gripping force should be such that no deformation of the flange or foot occurs. Hold the motor so that the motor side does not tilt or float.

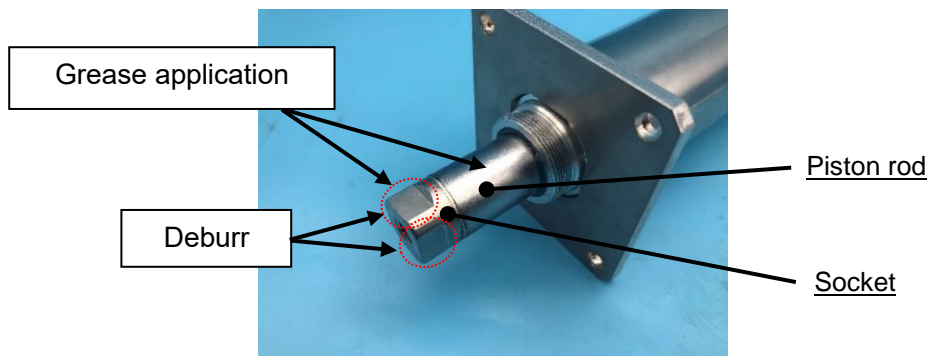


6. Turn and remove the rod cover.

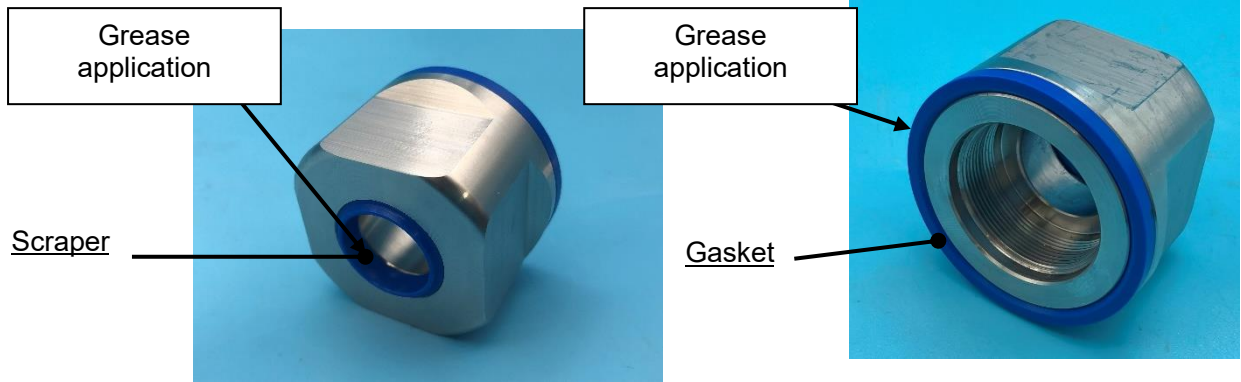


Model	Screw size	Max. tightening torque [N·m]	Rod cover width across flats [mm]
HF2A-LEY25	M30x1.0	33	41
HF2A-LEY32	M42x1.5	63	54
HF2A-LEY63	M56x1.5	79	70

7. Apply grease to the socket and piston rod. Deburr and grease the corners and width across flats of the socket. Refer to "Grease application" for grease application amount and method.



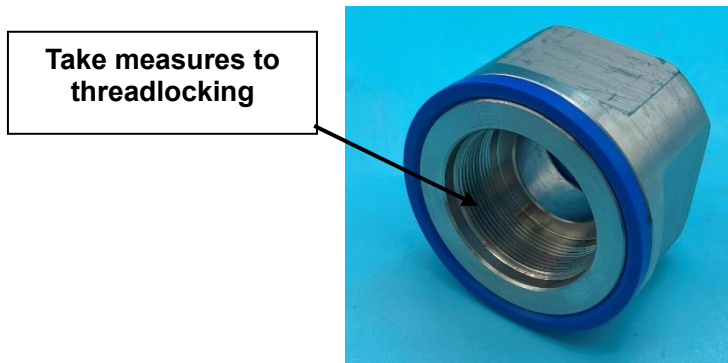
8. Apply grease to the scraper and gasket of the replacement rod cover assembly.



Model	Amount of grease (g)
HF2A-LEY25	0.1
HF2A-LEY32	0.1
HF2A-LEY63	0.2

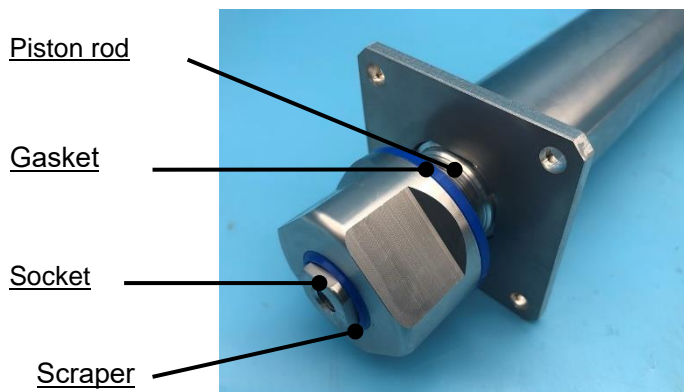
9. Take measures to threadlocking of the replacement rod cover assembly.

* Recommended threadlocker : LOCTITE®243



10. For assembly, perform steps 1. through 5. in reverse order.

Make sure the scraper, gasket, socket, and piston rod are lubricated with grease, and insert the scraper without scratching it.

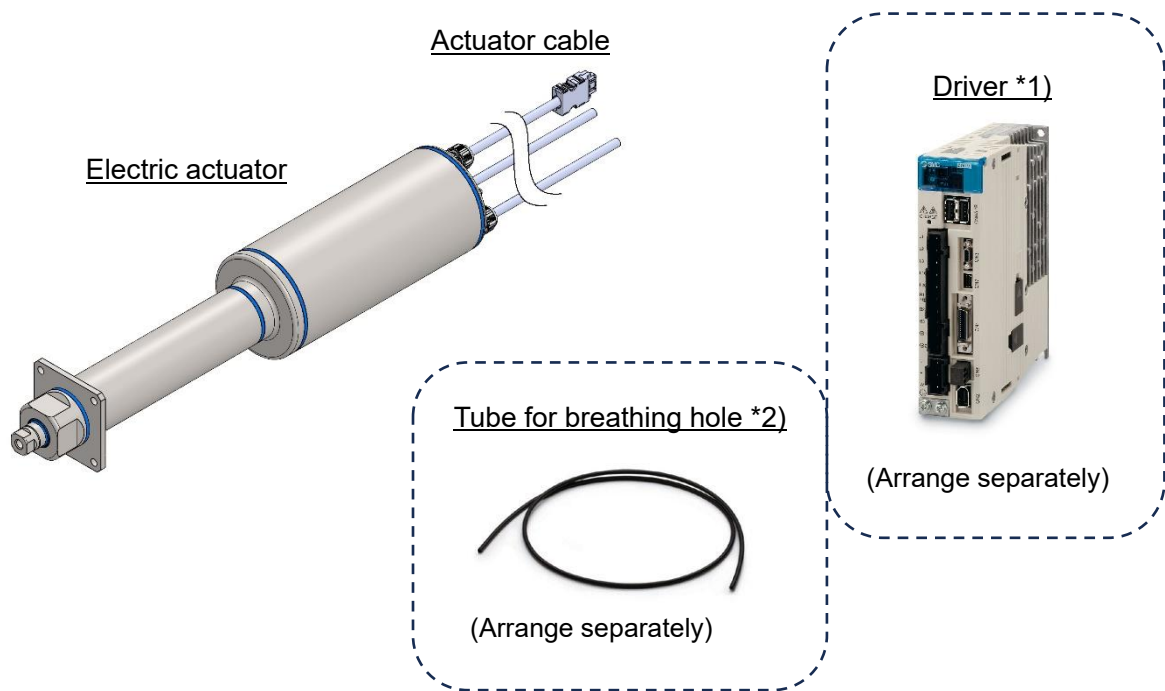


11. For assembly, perform steps 1. through 6. in reverse order.

1. Product Outline

1.1 System construction

An example of a system configuration using the electric actuator is shown below.



*1) Driver is not included. Please arrange separately.

For a driver system configuration, please refer to the driver manual.

*2) Use fitting "KFG2H0806-G02-E" for breathing port. Refer to the product catalog for details.
Please select a tube according to the conditions of use.

1.2 Features

Features of the electric actuator.

For a driver features, please refer to the driver manual.

- **Enclosure: IP69 equivalent**

Prevents dust and water droplets.

Under certain conditions, water pressure can also be used for washing.

- **Design**

Design for better liquid flow and less residual liquid accumulation.

- **Metal parts: Stainless steel 304, Seel parts: FDA compliant materials (Thermoplastic Polyurethane).**

The use of high anti-corrosion performance materials for the exterior improves corrosion resistance and environmental resistance.

FDA compliant materials (Thermoplastic Polyurethane) is used for the sealing parts. They are colored in blue for superior visibility.

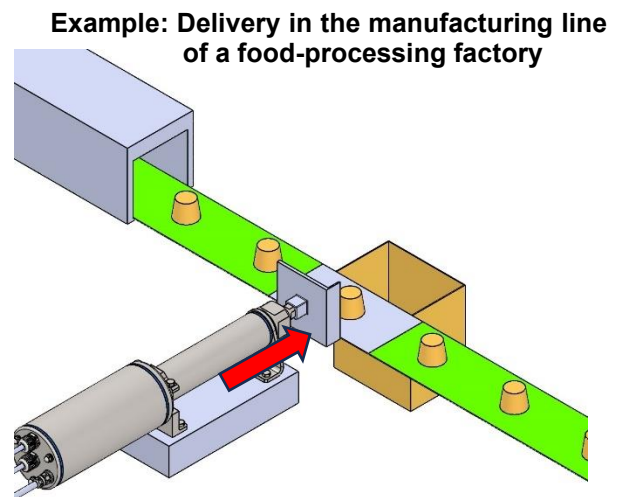
- **Supports a variety of drivers.**

Parallel input/output type and various fieldbus types are supported.

1.3 Application

Examples of use in the following environments.

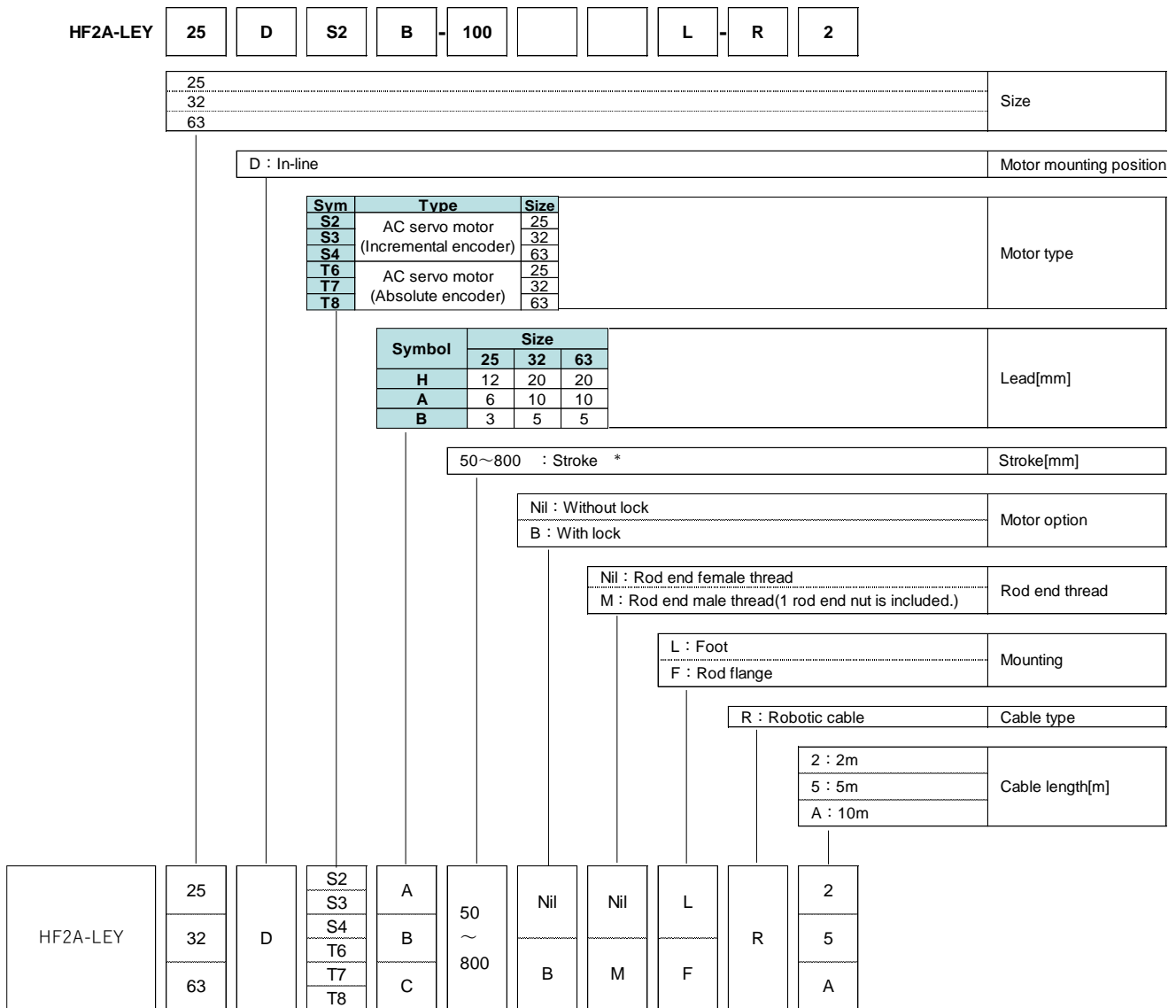
- Delivery in the manufacturing line of a food-processing factory.
- Pushing operations in the manufacturing line of a food-processing factory.
- Workpiece positioning in the washing tank.
- Use in areas subject to water droplets or dust..



Electric actuator **HF2A-LEY Series**

1.4 How to Order

How to order is shown below.



*For details, refer to the applicable stroke table below.

Weight[kg] / Stroke table

Model	HF2A-LEY25								
Stroke[mm]	50	100	150	200	250	300	350	400	
Product weight[kg]	3.8	4	4.2	4.5	4.7	4.9	5.1	5.4	

Model	HF2A-LEY32									
Stroke[mm]	50	100	150	200	250	300	350	400	450	500
Product weight[kg]	6.5	6.8	7.1	7.4	7.8	8.1	8.4	8.8	9.1	9.4

Model	HF2A-LEY63												
Stroke[mm]	50	100	150	200	250	300	350	400	450	500	600	700	800
Product weight[kg]	9.2	9.7	10.3	10.8	11.3	1.8	12.3	12.9	13.4	13.9	15	16	17

*Cable weight not included

Cable Weight[kg]

Cable type	Cable length[mm]		
	2	5	10
Motor cable	0.2	0.4	0.8
Encoder cable	0.2	0.6	1.2
Lock cable	0.1	0.2	0.4

Additional Weight[kg]

Size	25	32	63
Motor option:With lock	0.4	0.6	0.6
Rod end thread:Rod end male thread(1 rod end nut is included.)	0.1	0.1	0.1
Mounting: Foot (4 mounting screw is included)	0.4	0.8	1.0

1.5 Specification

Model			HF2A-LEY25			HF2A-LEY32			HF2A-LEY63						
Actuator specifications	Stroke [mm]		50~400			50~500			50~800						
	Work load [kg]	Horizontal *1	18	50	50	30	60	60	40	70	80				
		Vertical	8	16	30	9	19	37	19	38	72				
	Pushing force[N] *2 *3		65~131	127~255	242~485	79~157	154~308	294~588	156~521	304~1012	573~1910				
	Max. speed [mm/s] *4	Stroke range	~300	900	450	225	1200	600	300	1000	500	250			
			301~400	600	300	150									
			401~500	-			800	400	200				800	400	200
			501~600												
			601~700				500	250	120						
	701~800														
	Pushing speed [mm/s] *5		35 or less			30 or less									
	Max. acceleration/deceleration [mm/s ²]		5000												
	Positioning repeatability [mm]		±0.01												
	Lost motion[mm] *6		0.1 or less												
	Lead [mm]		12	6	3	20	10	5	20	10	5				
	Impact/Vibration resistance [m/s ²] *7		50/20												
Actuation type		Ball screw													
Guide type		Sliding bushing (Piston rod)													
Enclosure *8		IP69K equivalent													
Operating temperature range [°C]		5 to 40													
Operating humidity range [%RH]		90 or less (No condensation)													
Electric specification	Motor size		100W/□40			200W/□60			400W/□60						
	Motor type		AC servo motor (100VAC/200VAC)												
	Encoder *9		Motor type S*: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type T*: Absolute 22-bit encoder (Resolution: 4194304 p/rev) (Other than LECSC2-T□) Motor type T*: Absolute 18-bit encoder (Resolution: 262144 p/rev) (For LECSC2-T□)												
	Power [W] *10		Max. power 445			Max. power 724			Max. power 1275						
Lock unit specifications	Type *11		Non-magnetizing lock												
	Holding force [N]		131	255	485	157	308	588	313	607	1146				
	Power [W] at 20°C		6.3			7.9			10						
	Rated voltage [V]		DC24-10%												

*1 This is the max. value of the horizontal work load. An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load changes according to the condition of the external guide. Confirm the load using the actual device.

*2 The force setting range (set values for the driver) for the force control with the pushing operation.

The force and duty ratio change according to the set value. Set it while referencing the "Force Conversion Graph" and the "Load-Acceleration/Deceleration Graph" in the catalog. For drivers that support pushing operation, refer to the driver catalog. To set the pushing operation settings, refer to the driver manual.

* For customer-provided PLC and motion controller setting and.

*3 The pushing force values for HF2A-LEY*D(S2/S3) are 15% to 30%, for HF2A-LEY*DS4 are 15% to 50%, for HF2A-LEY*D(T6/T7) are 12% to 24% and for HF2A-LEY*DT8 are 12% to 40%.

*4 The allowable speed changes according to the stroke. Set the number of rotations according to speed.

*5 The allowable collision speed for collision with the workpiece with the pushing operation.

*6 A reference value for correcting errors in reciprocal operation.

*7 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.) Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

*8 Cable is not IP69K equivalent.

*9 The resolution will change depending on the driver type.

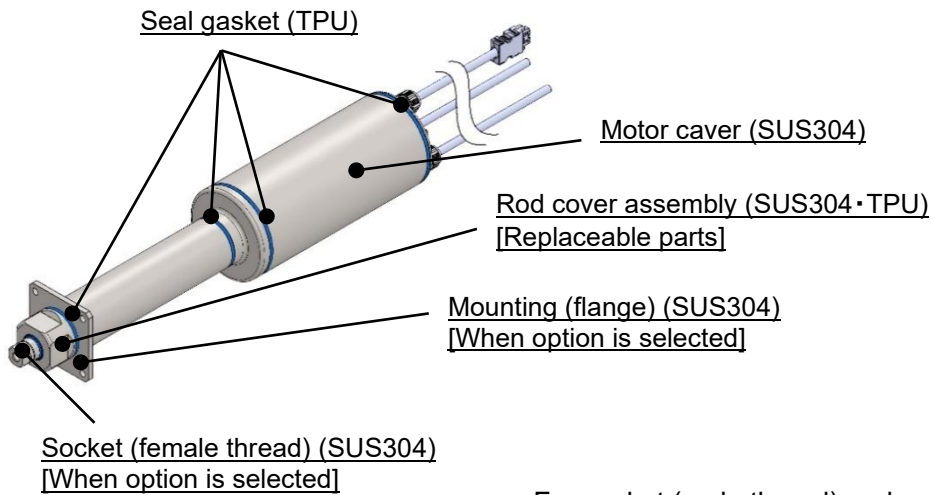
*10 Indicates the max. power during operation (including the driver). When selecting the power supply capacity, refer to the power supply capacity in the operation manual of each driver.

*11 Only when motor option "With lock" is selected.

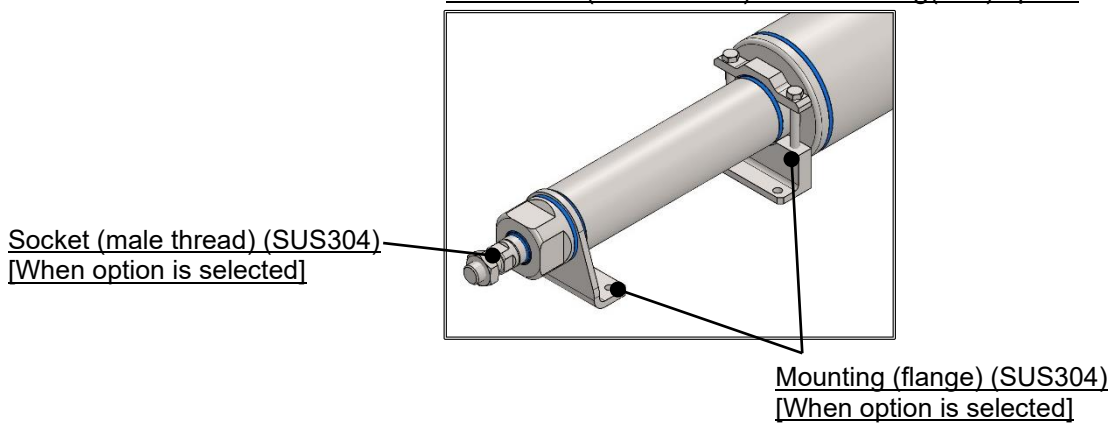
1.6 Construction

■ Components

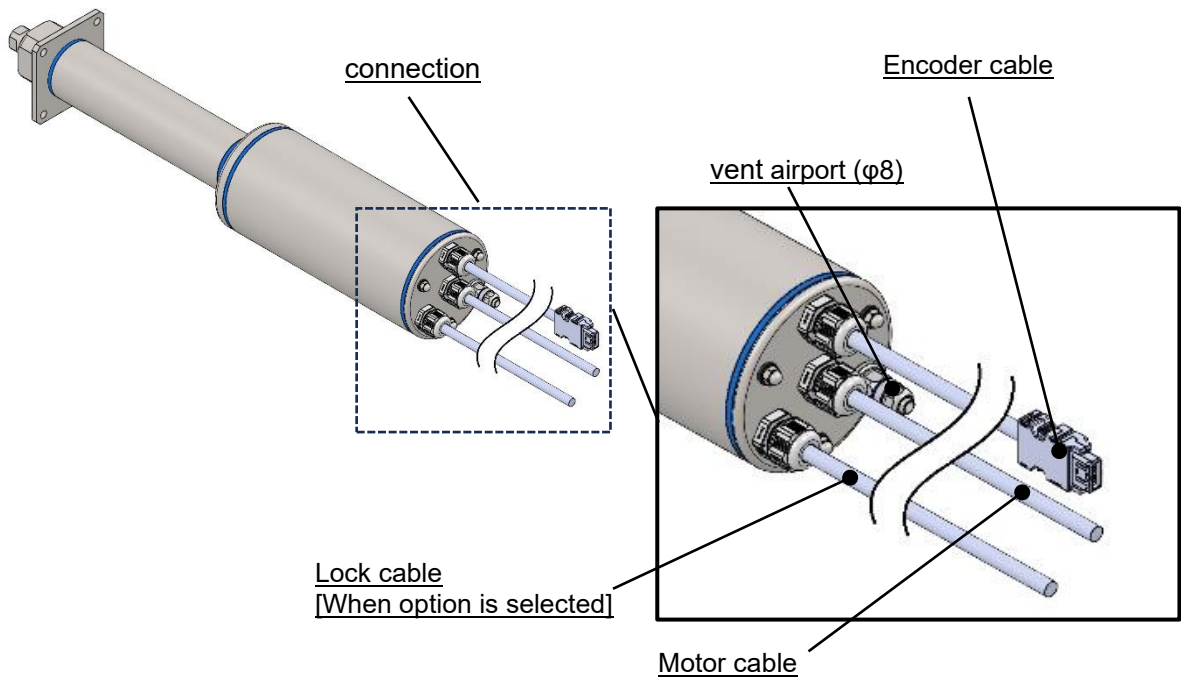
Rod side



For socket (male thread) and mounting(foot) option



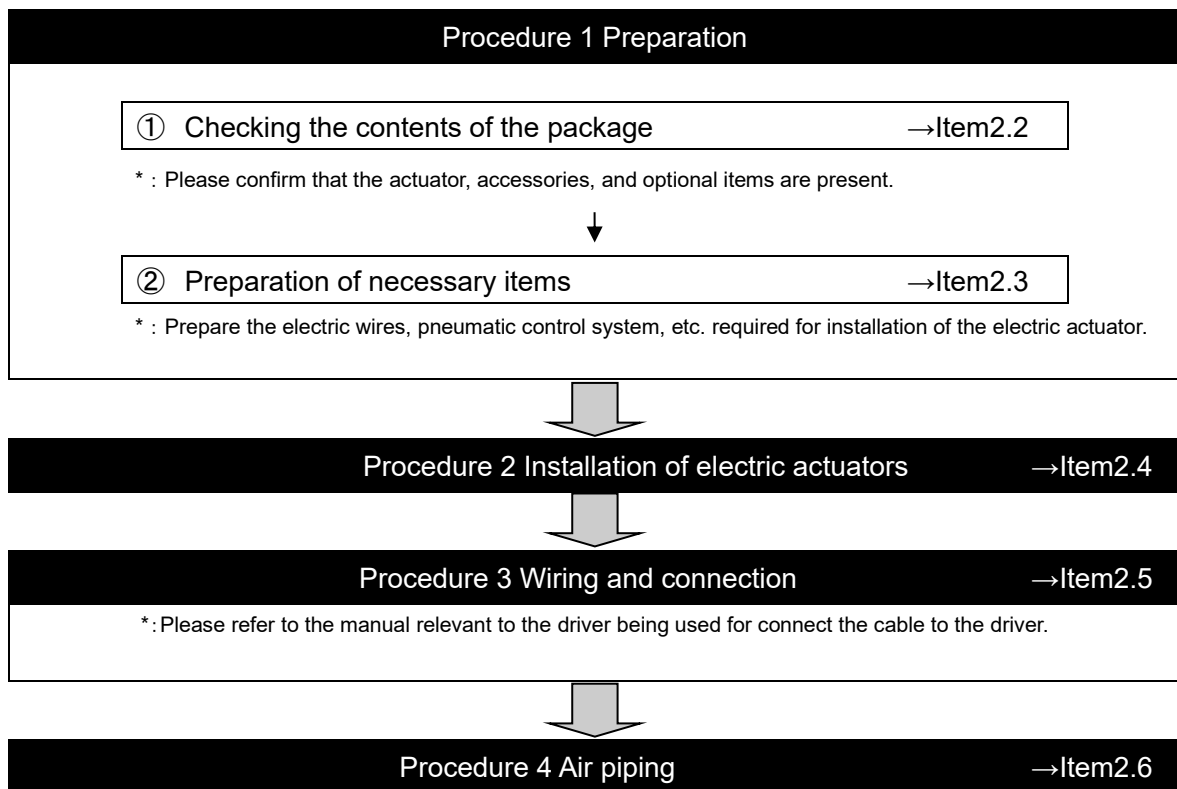
Motor side



2. Installation

2.1 Flow procedure from installation

Be sure to check the procedure below before use.



2.2 Check the contents of the package

After unpacking everything, check the description on the laser printing to identify the electric actuator. If any parts are missing or damaged, please contact your distributor.

Drivers must be arranged separately.

No.	Product Name and Number	Quantity
1	Electric actuator / HF2A-LEY Series	1pcs.

1. Electric actuator



[Arrange separately]

Driver



Air tube



2.3 Preparation of necessary items

Please prepare the following items for installation and wiring.
Please refer to the AC servo motor driver catalog and manual relevant.

- Driver.
- Wiring cables.
- Product and work mounting screws.

Please provide the following equipment to use the vent airport.

- Tubing($\phi 8$ / Series T*).

Please provide the following equipment to run the system.

- 24 VDC power supply.
- 100/200 VDC power supply.
- PC.
- PLC.

2.4 Installation of electric actuators

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

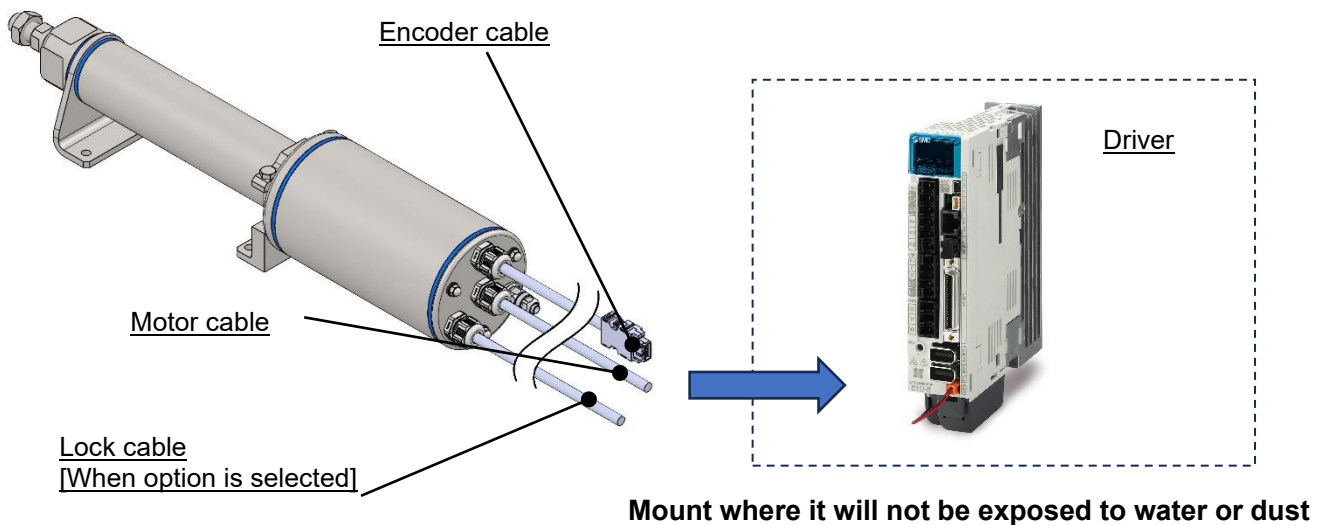
(1) Mounting

Please refer to "Mounting" in "Precautions for product specific" for information on screws and tightening torques to be used for mounting workpieces and tools and for mounting the actuator.

2.5 Wiring and connection

Connect the various cables of the electric actuator to the driver. Please refer to the driver manual for connect the cable to the driver.

The cable is equivalent to IP67. Install the cable so that water pressure is not applied to the cable during washing. The driver and the connectors on the driver side are not covered by IP protection. Mount where it will not be exposed to water or dust.

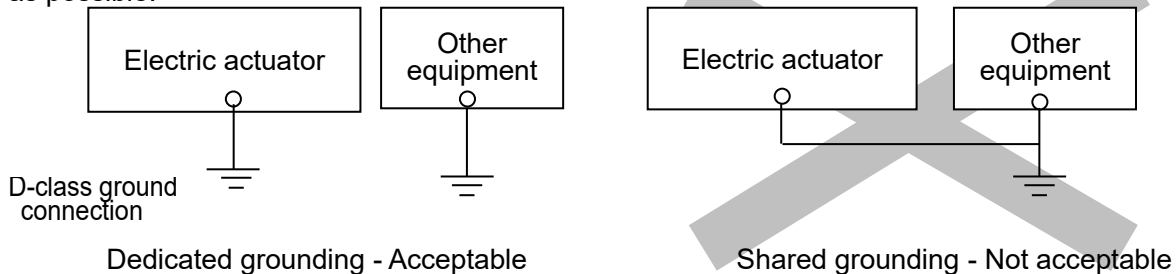


⚠ Caution

The earth should be a dedicated earth connection. Use a D-class ground connection (ground with a resistance of less than 100 ohm).

The cross sectional area of the grounding cable shall be 2mm² minimum.

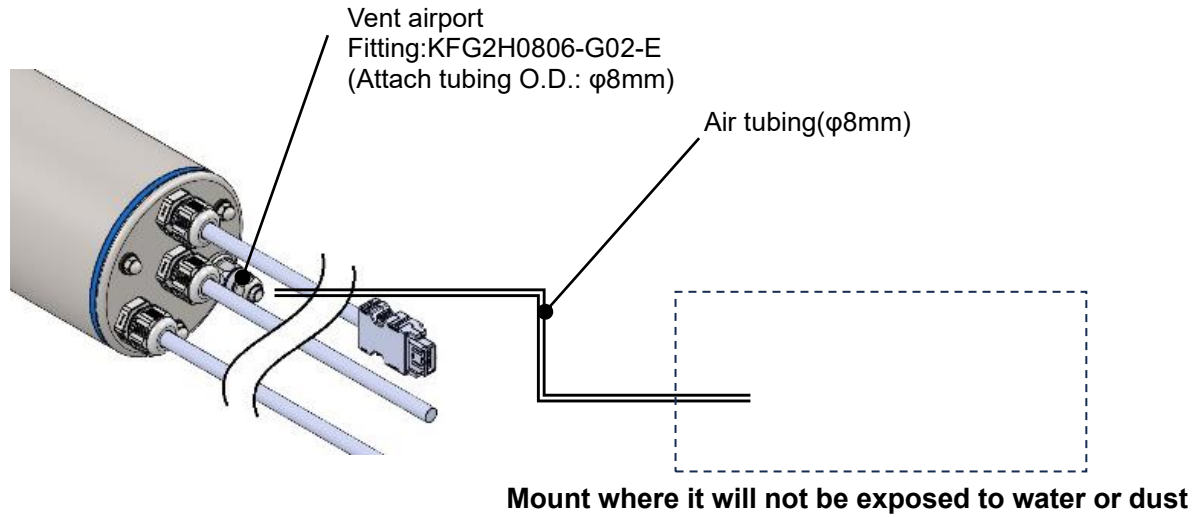
The Grounding point should be as near as possible to the actuator. Keep the grounding cable as short as possible.



2.6 Air piping

Connect the air tube to the vent airport of the electric actuator, and then place the end of the tubing in an area where it is not exposed to dust or water. When the actuator is used without mounting the tubing to the vent airport, water or dust may enter the inside of the actuator, resulting in a malfunction.

The vent airport uses our KFG2H0806-G02-E. Please refer to the product catalog and instruction manual for precautions on the use of compatible tubes and fittings.



3. Operation

Please refer to the driver manual to the driver being used.

4. Alarm detection

Please refer to the driver manual to the driver being used.

5. Troubleshooting

Please refer to the driver manual to the driver being used.

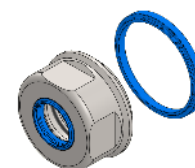
6. Optional parts (sold separately)

The optional parts described below are available (sold separately).

- Rod cover assembly
- Grease pack

6.1 Rod cover assembly

Name	Model	Order no.
Rod cover assembly	HF2A-LEY25	LEY-D-11-1
	HF2A-LEY32	LEY-D-11-2
	HF2A-LEY63	LEY-D-11-3



6.2 Grease pack

Applied portion	Order no.	Volume
Rod cover gasket Piston rod	GR-R-010	10g

Revision history

April 2024: First edition

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URL <http://www.smcworld.com>

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

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