Safety Precautions

Be sure to read this section before use.

When designing equipment using electric actuators, the manufacturer is obligated to ensure that the safety of the mechanism and the system that runs the electrical controls are secured.
It is important to select, use, handle and maintain CKD products appropriately to ensure their safe usage.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use the product within the specifications range.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product. This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors or for use under the following conditions or environments. (Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

❶ Use for special applications including nuclear energy, railways, aircrafts, marine vessels, vehicles, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency operation (shutoff circuits, releases, etc.), press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be significantly affected, and special safety measures are required.

3 Observe organization standards and regulations, etc., related to the safety of the device design.

4 Do not remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or maintaining equipment, be sure to shut off the power supply of the equipment and relevant facilities, using caution to avoid electrical shock.

5 Observe the instructions and precautions of each product to prevent accidents.

❶ During teaching work and trial operation, there may be unexpected operation, so be careful not to touch the actuator. When operating from a position where the actuator cannot be seen, make sure that it is safe for the output shaft to rotate before operation.

6 Observe the precautions to prevent electric shock.

❶ Do not touch the controller interior heat sink, cement resistor, or motor. The high temperatures can cause burns by touching associated parts. Only after sufficient time has passed, conduct inspections, etc. Even immediately after turning OFF the power supply, a high voltage will be applied until the electric charge stored in the internal capacitor is discharged. Do not touch for about 3 minutes.
❷ Before maintenance and inspection, turn OFF the controller power supply switch.
There is a risk of electrical shock from high voltage.
❸ Do not attach or detach connectors while the power is ON. This may cause malfunction, failure, or electric shock.

7 Install an overcurrent protector.

The driver should be wired in accordance with JIS B 9960-1:2019 (IEC 60204-1:2016) Safety of Machinery - Electrical Equipment of Machines - Part 1: General Requirements. Install an overcurrent protector (a circuit protector or a shutoff mechanism for wiring) on the main power supply / control power supply / and the I/O power supply.

(Reference: JIS B 9960-1 7.2.1 General description)
When the circuit current may exceed either the rated value of the component or the allowable current of the conductor, an overcurrent protection must be provided. The details of the ratings or set values to be selected shall be provided in 7.2.10.

8 Observe the following precautions to prevent accidents.

■ Precautions are ranked as "DANGER", "WARNING", and "CAUTION" in this section.

DANGER (DANGER): In the case where the product operation is mishandled and/or when the urgency of a dangerous situation is high, it may lead to fatalities or serious injuries.

WARNING (WARNING): A dangerous situation may occur if handling is mistaken, leading to fatal or serious injuries.

CAUTION (CAUTION): A dangerous situation may occur if handling is mistaken, leading to minor injuries or property damage.

Note that some items indicated with "CAUTION" may lead to serious results depending on the conditions. All items contain important information and must be observed.

Warranty

1 Warranty period

This warranty is valid for one (1) year after delivery to the customer's designated site.

2 Scope of warranty

In case any defect clearly attributable to CKD is found during the warranty period, CKD shall, at its own discretion, repair the defect or replace the relevant product in whole or in part and at no cost, according to its own judgment.

Note that the following failures are excluded from the warranty scope:

(1) Failures due to use outside the conditions and environments set forth in the catalog, specifications, or instruction manuals
(2) Failures resulting from factors exceeding durability (frequency, distance, time, etc.) or relating to consumable parts
(3) Failures resulting from factors other than this product.
(4) Failures caused by improper use of the product.
(5) Failures resulting from modifications or repairs made without CKD consent.
(6) Failures caused by matters that could not be predicted with the technologies in practice when the product was delivered.
(7) Failures resulting from natural disasters or accidents for which CKD is not liable.

The warranty covers the actual delivered product, as a single unit, and does not cover any damages resulting from losses induced by malfunctions in the delivered product.

Note) Contact the nearest CKD Sales Office for details on durability and consumable parts.

3 Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

4 Service range

The service costs for dispatched technicians are not included in the price of delivered items. The following will be charged separately.

(1) Mounting adjustment guidance and trial run observation
(2) Maintenance inspection, adjustment and repair
(3) Technical guidance and technical education (operation, programming, wiring method, safety education, etc.)

Precautions for export

Products and related technologies in this catalog

The products and related technologies in this catalog are subject to US Export Administration Regulations (EAR), and display of EAR-compliant products is marked on the product page.

For export or provision of products or related technologies subject to EAR regulations, we request that the US Export Administration Regulations (EAR) be observed appropriately.

Safety Precautions

Be sure to read this section before use.

Common precautions: Electric actuator D Series / Controller ESC3

Design / Selection

1. Common

⚠DANGER

■ Do not use in places where dangerous goods such as ignitable substances, inflammable substances or explosives are present.
There is a possibility of ignition, combustion or explosion.

■ Ensure that the product is free of water droplets and oil droplets.
Failure to do so may cause fire or malfunction.

■ When mounting the product, be sure to securely hold and fix it (including the workpiece).
If the product falls, is knocked over, or experiences malfunction, it may lead to injury. As a rule, fix the product using all mounting holes.

■ Use a DC stabilized power supply (24V DC ±10%) for the input/output circuit power supply and the ESC3 Series motor and control power supplies.
Connecting directly to the AC power supply may cause fire, explosion, damage, etc.

⚠WARNING

■ Use the product in the range of conditions specified for the product.

■ Provide a safety fence to prevent entry to the movable range of the electric actuator. In addition, install the emergency stop button switch as a device in a location which is easy to operate in an emergency situation. For the emergency stop button, use a structure and wiring that will prevent automatic restoration or inadvertent restoration by personnel.

■ It may take several seconds to complete an emergency stop, depending on the travel speed and load.

■ Design a safety circuit or equipment so that damage to equipment, injury to persons, etc., does not occur when the machine stops in the event of a system failure such as emergency stop or power outage.

■ Install indoors with low humidity.
There is a risk of electric leakage or fire accidents in places exposed to rainwater or where there is high humidity (humidity of 85% or more, condensation). Oil drops and oil mist are also strictly prohibited. Use in such an environment could lead to damage or operation failure.

■ Make sure that the product is D type grounded (ground resistance of 100 Ω or less).
If electrical leakage occurs, it may lead to electric shock or malfunction.

■ Use and store in accordance with the working/storage temperatures and where there is no condensation. (Storage temperature: -10°C to 50°C, storage humidity: 35% to 80%, operating ambient temperature: 0°C to 40°C, operating ambient humidity: 35% to 80%)
Otherwise, abnormal stopping or decreased product service life may result. Ventilate in locations where heat may build up.

■ Do not use this product in a location where the ambient temperature could suddenly change and cause dew to condense.

■ Install in a location free from direct sunlight, dust, and corrosive gas/explosive gas/inflammable gas/combustibles, and away from heat sources. Furthermore, chemical resistance has not been reviewed for this product.
Failure to comply may lead to damage, explosion, or combustion.

■ Use and store in locations free from strong electromagnetic waves, ultraviolet rays, or radiation.
Otherwise, malfunction or damage may result.

■ Take possibility of power source breakdown into consideration.
Take measures to prevent bodily injury or machine damage even in the event of a power failure.

■ Take the operational status into consideration if the machine is reactivated after emergency or abnormal stops.
Design the system so that bodily injury or equipment damage will not occur when restarting. If there is a need to reset the electric actuator to the starting position, design a safe control device. Consider the possibility of power failure of the mounted motor. Take measures to prevent bodily injury or machine damage even in the event of a power failure.

■ Avoid using this product where vibration and impact are present.

■ Do not apply a load to the product that is greater than or equal to the allowable load listed in the materials for selection.

■ If there is a risk of bodily injury, install a protective cover.
If the actuator's drive section could cause bodily injury, install a protective cover. Design a structure that prevents person(s) from entering the actuator's operating range or coming into contact with those sections directly.

■ Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠CAUTION

■Do not use in a range where the moving table and rod could collide with the stroke end.

■The product is manufactured in conformity with the related standards. Do not disassemble or modify the product.

■The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

■Set up the wiring so as not to apply inductive noise.
Avoid locations where large currents or strong magnetic fields are generated. Do not wire together with other large motor power lines (with multi-conductor cables). Do not wire the same as inverter power supplies used for robots, etc. Apply a frame ground for the power supply and insert the filter to the output part.

■Do not use this product in an environment where strong magnetic fields are generated.
This could cause improper operation.

■Be sure to separate the power supply of the output of this product and the power supply of inductive loads that generate surges, such as solenoid valves and relays.
If the power supply is shared, surge current may flow into the output and cause damage. If a separate power supply cannot be used, connect the surge absorber directly to all inductive loads in parallel.

■Select a power supply which provides ample capacity based on the number of installed products. Malfunction may occur if there is no excess capacity.
□20 …0.8 A / base
□28 …2 A / base
□35 …3 A / base
□42 …3 A / base
□56 …3 A / base

■Use a movable cable with a bending radius of 39 mm or more.
Because the bending radius does not apply to bending of the connector part, we recommend fixing near the connector.

■Use a cable within 10 m to connect the IF connector.

■The detection range of the cylinder switch changes depending on the temperature and mounting. Select a model that has sufficient margin against the stroke range.

■If the rod side cylinder switch contacts moving parts, select an L-shaped cylinder switch.

2. DSSD2 Series

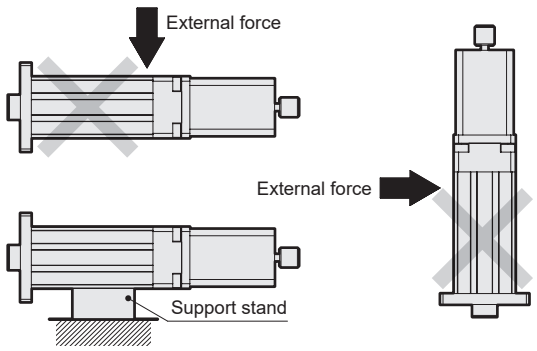
⚠CAUTION

■To avoid damaging the screw on the end of the piston rod and bushing wear and burning, etc., connect the end of the piston rod and load with a floating fitting or simplified floating fitting so twisting does not occur at any position in the stroke.

■If the gap between clevis and the corresponding bearing is large, the pins and shaft will bend. Therefore, keep this gap relatively small.
(Recommended fit: H10/e8)

■Do not apply external force to the body when mounting the flange (option). External force may lead to malfunction or part damage.
Install a support stand when front-mounting horizontally. Vibration caused by operation conditions or the installation area could damage the actuator body. If the body will be subject to external force use the mounting holes on its base to fix the body in place. Avoid fixing the flange mounting hole only.

[For flange mounting]



3. DMSDG Series

⚠WARNING

■Depending on the pressing amount, the self-lock may not function when not energized. Use a safe design that takes this into consideration.

■The workpiece may come off during a power outage or similar. Incorporate a safety device that prevents injury or mechanical damage.

⚠CAUTION

■Do not use the actuator as a stopper.

4. DSTK Series

⚠CAUTION

■When using a stopper actuator to brake loads directly connected to actuator, etc

● The specified range is only for stopping pallets on the conveyor. When using a stopper cylinder to stop loads directly connected to cylinder, etc., because the cylinder thrust is applied as a lateral load, select the actuator within the range of allowable absorbed energy and allowable lateral load.

5. DLSH / DCKW Series

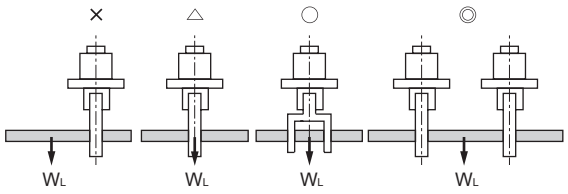
⚠WARNING

■The gripping force may decrease during a power outage or similar. Use a safe design that takes this into consideration. The gripping force may decrease during a power outage or similar, dislodging the workpiece, so be sure to incorporate a safety mechanism to prevent injury or mechanical damage.

■Depending on the gripping amount, the self-lock may not function when not energized. Use a safe design that takes this into consideration. The workpiece may come off during a power outage or similar. Incorporate a safety device that prevents injury or mechanical damage.

⚠CAUTION

■ When gripping long or large workpieces, stable gripping requires a grip on the center of gravity. Stability is a must when using larger or multiple workpieces as well.

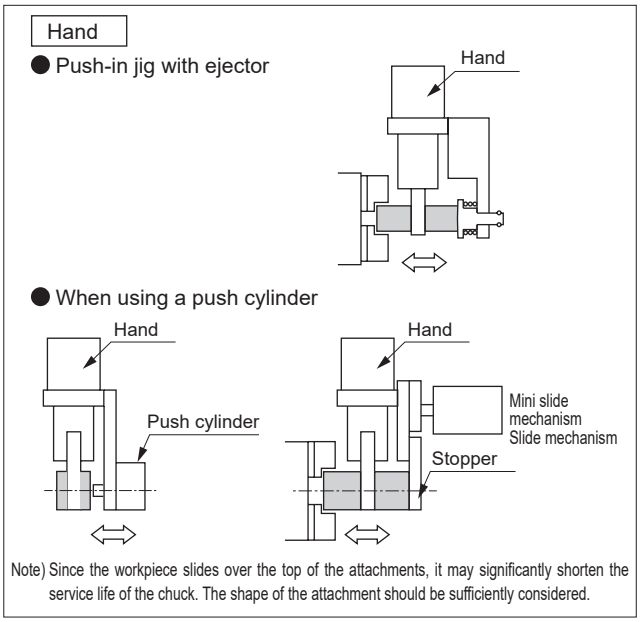


◎: Excellent, ○: Good, △: Conditional, × : NG

■ The detection range of the cylinder switch changes depending on the temperature and mounting. Select a model that has sufficient power to grip the workpiece weight.

■ Select a model that has sufficient opening/closing width for the workpiece size. The gripping position may become unstable due to variation in the open/close width or the workpiece. When opening after gripping operation, increase the stroke by an amount corresponding to the backlash amount.

■ If directly inserting the workpiece into the jig with the hand, consider clearance during design. The hand could be damaged.



Note) Since the workpiece slides over the top of the attachments, it may significantly shorten the service life of the chuck. The shape of the attachment should be sufficiently considered.

6. Cylinder switch

⚠ WARNING

■ Application, load current, voltage, temperature, impact, environment, etc., outside the specifications will result in damage or operation faults. Use the device as instructed in the specifications.

■ Never use this product in an explosive gas atmosphere. The cylinder switch does not have an explosive-proof structure. Never use in an explosive gas atmosphere as explosions or fires could result.

⚠ CAUTION

■ Avoid using in an environment constantly exposed to water.

● Insulation failure can cause malfunctions.

■ Avoid using this product in environments containing oil or chemicals.

● The cylinder switch may be adversely affected (insulation failure, malfunction caused by swelling of the filled resin, hardening of lead wire sheath, etc.) if used in an environment containing oil, coolant, cleaning fluid, or chemicals. Consult with CKD.

■ Do not use in a high-impact environment.

■ Do not use this product in surge generating areas.

If there is a device components (solenoid lifter, high frequency induction furnace, motor, etc.) around the actuator with proximity switch that generates a large surge, consider surge protection of the source as it may lead to deterioration or damage of the switch internal circuit element.

■ Be careful of accumulation of iron powder and contact with magnetic substances.

If a large amount of iron chips such as cutting chips or welding spatter accumulate or if magnetic objects (material attracted to magnets) contact the actuator with a cylinder switch, the actuator will be demagnetized and cylinder switch operations may be inhibited.

■ Pay attention to the proximity of actuators, etc.

● When installing more than 2 cylinders with switches in parallel, keep sufficient distance between the cylinder tubes according to the actuator series. Mutual magnetic interference may cause the switch to malfunction.

Mounting, installation and adjustment

1. Common

⚠DANGER

- Do not enter the operating range of the product while the product is operable.
  The product may suddenly move and may result in injuries.
- The wiring should be in accordance with JIS B 9960-1:20 19 Safety of Machinery - Electrical Equipment of Machines Part 1: General Requirements. Install an overcurrent protector (a circuit protector or a shutoff mechanism for wiring) for the primary side of the power supply.
- Do not operate the unit with wet hands.
  It may lead to electric shock.
- Fingers and other extremities may be snagged between the body and table during operation of the D STG, DSTS, DSTL, and D MSDG Series. Please be careful.
- The Control power supply and power supply are not isolated, so never connect the + and - of the power supply in reverse.
  There is a risk of damage to parts.

⚠WARNING

- Precision parts are built in, so laying the product on its side or applying vibration or impact during transportation are strictly prohibited.
  This may cause damage to the parts.
- For preliminary installation, place horizontally.
- Do not step onto the packaging or place objects on it.
- Avoid condensation, freezing, etc., and maintain ambient temperatures of -10 to 50°C and ambient humidity of 35 to 80% RH during transportation and shipping.
  Failure to do so may cause damage to the product.
- Mount the product on incombustible materials. Direct attachment or mounting to or near flammable materials may cause fire.
  There is a risk of burns.
- Do not step onto the product or place objects on it.
  This may result in falling, knocking the product over, injury due to falling, product damage and/or malfunctions due therein, etc.
- Take measures to prevent bodily injury or machine damage even in the event of a power failure.
  There is a risk of unexpected accidents.
- If the product generates abnormal heat, smoke or odor, turn OFF the power immediately.
  Otherwise, product may result in damage or fire.
- Stop operation immediately when abnormal noise or major vibration occurs.
  Otherwise, product damage or abnormal operation may result.
- Wire the product securely while confirming with this catalog and the instruction manual and ensuring that there is no miswiring or loose connectors. Check wiring insulation.
  Due to contact with other circuits, ground faults and insulation failure between terminals, overcurrent may flow into the product and damage it. This could lead to malfunction or fire.
- Be sure to insulate unused wires.
  Failure to do so may result in malfunction, failure, or electric shock.
- Do not damage the cable, snag it, apply excessive stress to it, or place heavy objects on it.
  Otherwise, poor conduction or electric shock may occur.
- Be sure to perform a safety check of the components' operating range before supplying power to the product. If the product LEDs do not light up when the power supply is turned ON, immediately turn the power OFF.
  Inadvertently supplying power can cause electric shock or injury.
- Before restarting a machine or device, check that measures are taken so that parts do not come off.
- Check that the motor is not energized when manually moving the movable parts of the product.
- The movable parts of the equipment may make unintended movements if the actuator or motor is in the power-off state. When switching the motor to the power OFF state, take steps to prevent danger and operate the motor with full attention to safety.
- Before operating the actuator, check that it will operate safely.
- When installing the actuator in a direction other than horizontal, provide an external stopper.
  The movable parts may fall and cause injury or workpiece damage when the power supply is turned OFF or the motor is tuned off.

⚠CAUTION

■ Regarding installing, setting up, and/or adjusting the actuator, read through the instruction manual and operate correctly.

■ When installing the product, be sure to secure space for maintenance work.
Otherwise, it may not be possible to conduct inspection and maintenance, leading to stoppage or damage of the device or injury during operation.

■ When carrying the product, support it from the bottom.

■ Do not hold the product's movable parts or cables during transportation and installation.
This may lead to injury or disconnection.

■ When transporting or installing the product, ensure sufficient operator safety by supporting the product securely with a lift or support, or by having more than one person working on the product, etc.

■ Do not install in places where large vibration or impact is transmitted.
This may cause malfunction.

■ Do not operate the movable parts of the product with external force or sudden deceleration.
This may lead to malfunction or damage due to regenerative current.

■ Do not use the mechanical stopper, etc., with products other than the DMSDG, DLSH, and DCKW Series.
Pressing operation is not supported. There is a risk of damage to the actuator's internal parts.

■ Durability varies with transported load and environment. The transport load, etc., should be at a setting well within the margin.

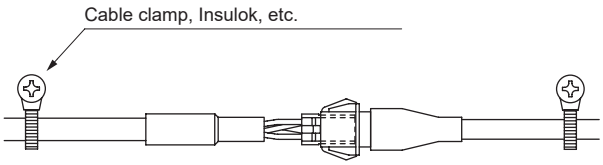
■ Make sure that no vibration / impact is applied to the movable parts.

■ Install such that no torsion or bending force is applied to the product.

■ When performing electric welding on the equipment to which the product is mounted, remove all F.G. (frame ground) wire connections to the product.
If electric welding is performed with the F.G. connection attached, the product may be damaged by the welding current, excessively high voltage during welding, or surge voltage.

■ Do not disassemble or modify the product.
This may cause injury, accident, malfunction or failure.

■ Do not move the cable leading out of the actuator. Fix the cable part. Furthermore, use cables with a bending radius of 40 mm or more.



■ Do not fix the cable leading out of the actuator in a pulled state.
There is a risk of damage to the actuator internal parts.

■ Avoid use in locations exposed to ultraviolet rays or with atmospheres of corrosive gas or salt.
Otherwise, degradation of performance, abnormal operation or deterioration in strength due to rust may result.

■ Make sure to use the dedicated cable for connecting between the actuator and controller.
Mistakenly connecting another component may cause malfunction or failure.

■ When wiring, do not apply excessive force to the connectors.

■ Do not push hard on the controller case.

■ When using a positioning hole, use a pin of dimensions that do not require press fitting. If a pin is press fitted, the load of press fitting may damage or distort the linear guide, lowering the accuracy. The recommended tolerance of a pin is JIS tolerance m6 or less.

■ To move the motor when not energized, turn the manual operation shaft to move the motor. Do not apply excessive force to the manual operation shaft. Otherwise it could be damaged or malfunction.

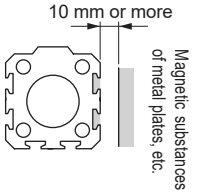
■ Use with a load that does not exceed the specified range. Using the product outside the specifications range may cause the motor to step out.

■ Fix the cylinder switch at a position allowing sufficient margin in relation to the stroke.
There is a risk that it will collide with the mechanical end and cause the motor to step out.

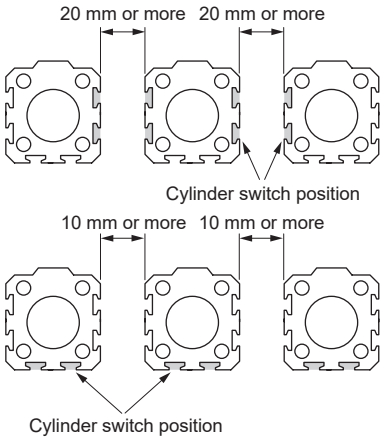
2. DSSD2, DSTK Series

⚠CAUTION

■ The cylinder switch may malfunction if there is a magnetic substance such as a metal plate installed adjacently. Confirm that a distance of at least 10 mm is allocated from the surface of the cylinders.
(Same clearance for all bore sizes)



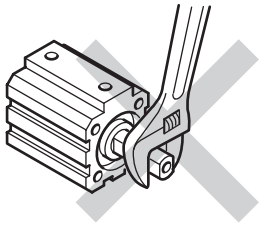
■ The cylinder switch may malfunction if cylinders are installed adjacently. Check that the following distances are allocated between cylinders. (Same clearance for all bore sizes)



■ Do not use the product so as to apply rotation torque to the piston rod.
The bushing for the rotation lock may deform and significantly shorten the service life.

■ Use the product so that load on the piston rod is always applied in the rod axial direction.

■ When fixing a workpiece onto the tip of the piston rod, retract the piston rod to the stroke end and apply a wrench to the section protruding from the rod's parallel section. Tighten so that torque is not applied to the cylinder body.



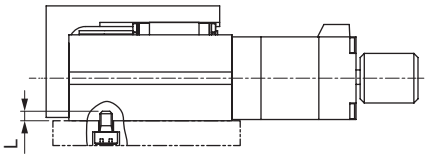
■ Use an external guide when transporting. Check that it operates smoothly in all positions of the product stroke before installation.

3. DMSDG Series

⚠CAUTION

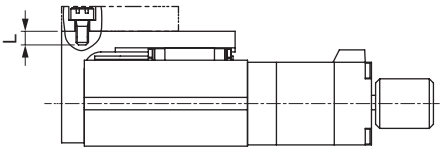
■ Installation
Do not damage the surface flatness by denting or scratching the body (tube) mounting surface or the table surface. Make sure that the flatness of the mating surface for table mounting is 0.05 mm or less.

■ Tighten the body mounting screws with the appropriate torque.



Item	Bolt used	Tightening torque (N·m)	Max. insertion Depth L (mm)
DMSDG-08	M3×0.5	0.59	3
DMSDG-16	M3×0.5	0.59	5

■ Use appropriate tightening torque when fixing the jig on the table.



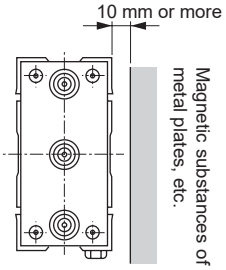
Item	Bolt used	Tightening torque (N·m)	Max. insertion Depth L (mm)
DMSDG-08	M3×0.5	0.59	4
DMSDG-16	M4×0.7	1.4	5.5

4. DSTG, DSTS, DSTL Series

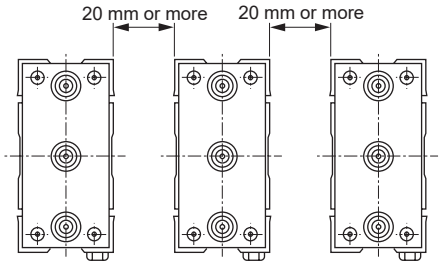
⚠CAUTION

■ Do not damage surface flatness by denting or scratching the body (tube) mounting surface or the end plate surface. Make sure that the flatness of the mating surface where the end plate will be attached is, as a guideline, 0.03 mm or below.

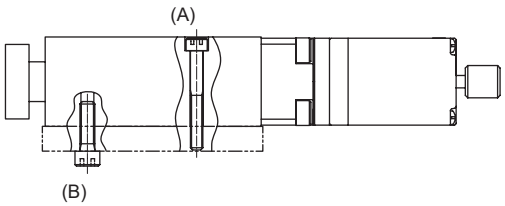
■ The cylinder switch may malfunction if there is a magnetic substance such as a metal plate installed adjacently. Check that a distance of 10 mm is provided from the surface of the actuator.
(Same for all bore sizes)



■ The cylinder switch may malfunction if actuators are installed adjacently. Check that the following distances are provided between cylinders.
(Same for all bore sizes)



■ Tighten the body mounting screws with the appropriate torque.

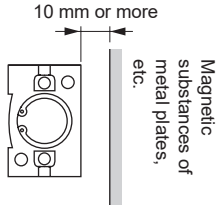


Item	(A) Mounting from top		(B) Mounting from bottom	
	Usage Bolt	Tightening torque (N·m)	Usage Bolt	Tightening torque (N·m)
DSTG-20	M5	3 to 5.4	M6	3 to 5.4
DSTG-32	M6	5.2 to 9.2	M8	5.2 to 9.2
DSTG-50	M8	12.5 to 22	M10	12.5 to 22

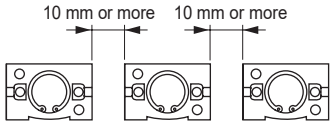
5. DLSH Series

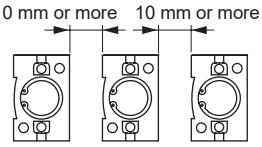
⚠CAUTION

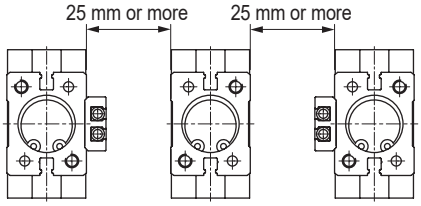
■ The cylinder switch may malfunction if there is a magnetic substance such as a metal plate installed adjacently. Check that a distance of 10 mm or more is provided from the surface of the actuator.



■ The cylinder switch may malfunction if actuators are installed adjacently. Check that the following distances are provided between cylinders.



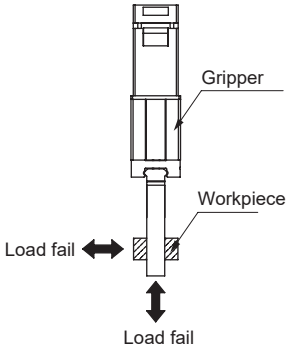




■ Do not cause dents or scratches that may damage flatness or perpendicularity on the body mounting surface and finger.

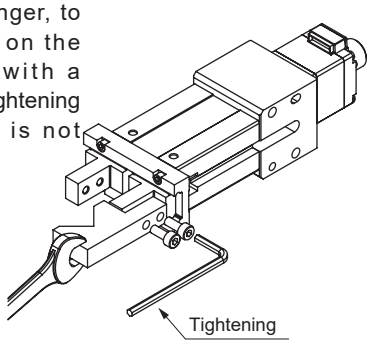
■ Do not retighten or disassemble, other than the screws used for fixing the body and finger.
This could lead to malfunction.

■ Be sure not to apply an excessive load to the fingers and attachment when attaching and detaching or conveying workpieces. Scratches and dents may occur on the rolling surface of the finger linear guide, possibly causing malfunction.



■ Attachment mounting method

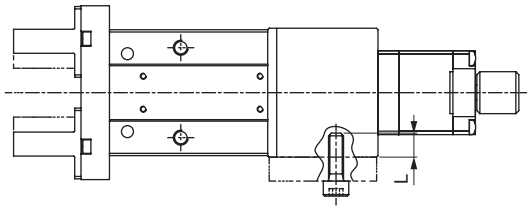
When mounting the attachment to the finger, to prevent any effect on the gripper, support with a wrench, etc., when tightening so that the finger is not twisted.



Item	Bolt used	Tightening torque (N·m)
DLSH-20	M4×0.7	1.4
DLSH-32	M6×1.0	4.9

■ Refer to the following section for body mounting.

● Side mounting



Item	Bolt used	Tightening torque (N·m)	Max. insertion Depth L (mm)
DLSH-20	M5×0.8	2.8	10
DLSH-20	M6×1.0	4.9	10

6. DCKW Series

⚠CAUTION

■ If a lateral load or load with a large impact is applied to the finger, play or damage could occur in the finger. Adjust and check that external force is not applied to the finger.

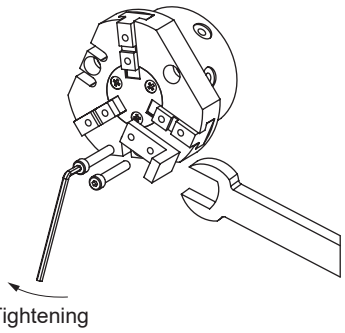
■ Pressing operation is accurate when performed as softly as possible at a low speed. Repeatability is also stable.

■ Regularly grease the sliding section of the finger. Regular replenishment can extend service life further.

■ When installing the attachment, check that a lateral load is not applied to the finger.

■ Attachment mounting method

When mounting the attachment to the finger, to prevent any effect on the chuck body, support with a wrench, etc., when tightening so that the finger is not twisted.



Item	Bolt used	Tightening torque (N·m)
DCKW-20	M3×0.5	0.59
DCKW-32	M4×0.7	1.4

7. Cylinder switch

⚠CAUTION

■ Do not drop or apply impact.

Do not drop, bump, or apply excessive impact (980m/s^2 or more proximity switch). Even if the switch case is not damaged, switch components could break or malfunction.

■ Do not carry the cylinder by the switch's lead wire.

Never do this: it not only causes disconnection of lead wires, but since stress is applied to the internal switch, it may also damage the switch's internal element.

■ Slide the switch from the outside of the operating range, and set at the rising position of the operating range.

Adjust the mounting position of the cylinder switch to the rising position of the operating range (ON range). (The actuator detects the rise of the switch and performs deceleration stop.) If the unit is set to the center of the operation range, the unit may stop further than the desired position and collide with the mechanical stopper, etc.

■Observe tightening torque when installing the switch.

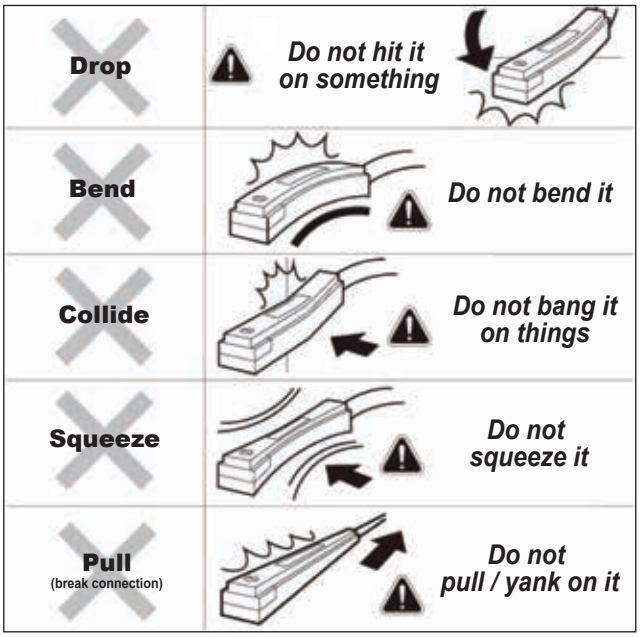
If the tightening torque range is exceeded, the set screw, mounting bracket, switch, etc., could be damaged. In addition, if tightening the set screw with a torque less than the min. tightening torque, the switch mounting position could be displaced. Use a flathead screwdriver (clockwork screwdriver, precision screwdriver, etc.) with a grip diameter of 5 to 6 mm, a 2.4 mm or smaller tip, and a thickness of 0.3 mm or less to tighten the fixing screw.

Item	Tightening torque (N·m)
T2, T3	0.1 to 0.2
F2, F3	0.03 to 0.08

■ Lead wire protection

The lead wire's min. bending radius is 9 mm or more (when fixed). Pay attention to wiring so repeated bending and tensile strain are not applied to the lead wire.

■External force



Use / Maintenance

1. Common

⚠DANGER

■ Do not operate the unit with wet hands.
It may lead to electric shock.

⚠WARNING

■ Wiring work and inspection should be done by a specialized technician.

■ When performing maintenance, inspection and repair, stop the power supply to this product.
Caution people in the vicinity that a third party should not turn ON the power inadvertently.

■ Do not attach or detach wiring or connectors with the power supply ON.
Failure to do so may cause malfunction, failure, or electric shock.

■ For wiring work and inspection, check the voltage with a tester after more than 5 minutes have elapsed since turning OFF the power.
It may lead to electric shock.

■ Mount the product before wiring.
It may lead to electric shock.

■ Make sure that the diameter of the lead wire used for the power cable can tolerate up to 8.6A of current.
Otherwise, heat generation or damage during operation may be caused.

■ Do not connect the product's communication connector to other components.
Doing so may cause failure or damage.

■ Turn OFF the power supply in the event of a power failure. When the power is restored, the product may move unexpectedly and cause accidents.

■ Perform a safety check of the components' operating range before supplying power to the product.
Inadvertently supplying power can cause electric shock or injury.

■ Do not enter the operating range while the product is operable.

■ Do not touch the product with hands or body during operation or immediately after stopping.
This may cause burns.

■ Do not step onto the product or place objects on it.
This may result in falling, knocking the product over, injury due to falling, product damage, malfunctions due thereto, etc.

■ Take measures to prevent bodily injury or machine damage even in the event of a power breakdown.
There is a risk of unexpected accidents.

■ Before operating from a position where the actuator cannot be seen, confirm that it can be safely operated.

■ Check that the motor is not energized when manually moving the movable parts of the product.

■ If the product generates abnormal heat, smoke or odor, turn OFF the power immediately.
Otherwise, product may result in damage or fire.

■ Stop operation immediately when abnormal noise or major vibration occurs.
Otherwise, product damage or abnormal operation may result.

⚠CAUTION

■ Do not put fingers or objects into the opening of the product.
This may cause product damage or injury.

■ Do not dent or damage the movable parts.
This may cause malfunction.

■ Do not enter the motor in the energized state with gravity or inertia applied.
The motor may continue to operate or fall during the power-OFF state. Be sure to operate the motor in the non-energized state in a balanced state without gravity or inertia applied, or confirm safety before proceeding.

■ Do not put the motor in the energized state while the motor is accelerating or decelerating.
Doing so may result in a dangerous change in speed (acceleration).

■ When operation involves vibration, change the set speed so that vibration does not occur.

■ Vibration may occur even within the operation speed range depending on the working conditions.

■ Do not disassemble or modify the product.
This may cause injury, accident, malfunction or failure.

■ Ensure proper operation through periodic inspections (2 to 3 times per year).

■ When disposing of the product, follow all laws concerning waste processing and cleaning, and be sure to consign the processing to a specialized waste management service company.

■ The circuit board inside the product has capacitors connected in between the circuits and the metal body to prevent damage due to static electricity. Avoid withstand voltage and insulation resistance tests on equipment with this product installed. If tests are done, the product will be damaged. If it is necessary for the equipment, remove the product before doing the test.

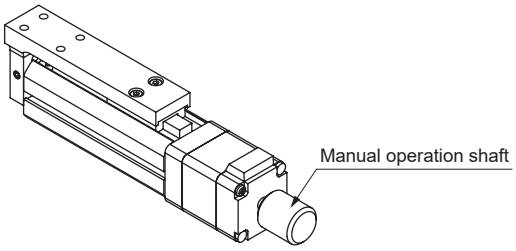
■ Be sure to check the actuator and controller combination before starting operation.
The controller differs according to the model and size specifications. If operated with an incorrect combination, unexpected movement may result in an accident.

■ Frequently turning the power ON/OFF can cause damage to the elements inside the controller.

■ Use the product in the range of conditions specified for the product.
The elements inside the controller may overheat and be damaged.

■ The relationships between pressing force (gripping force) and pressing force (gripping force) settings described in this catalog are merely guidelines. Fluctuation in motor torque, etc., may cause errors even at the same set values.

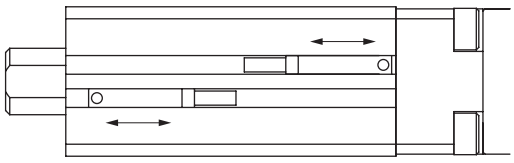
■ To move the movable part while the motor is not energized, turn the manual operation shaft. However, do not apply excessive torque to the manual operation shaft. Otherwise it could be damaged or malfunction.



■ Do not touch the manual operation shaft during operation.

■ Correctly open and close the cylinder switch at PUSH/PULL.
The actuator decelerates and stops after detecting the cylinder switch. Misoperation may occur if the switch is installed in the wrong direction.

■ The operating position of the cylinder switch may change due to the temperature, so the actuator's stop position and gripping force may change slightly.
If the amount of change is a problem, readjust the cylinder switch position.



■ Change the controller rotary switch while it is stopped.
If it is changed during operation, it may cause abnormal operation.

2. DMSDG Series

⚠CAUTION

■ When pressing the workpiece, use only in the PUSH direction.
Applying a load to the rod in the PULL direction may cause breakdown.

3. DSTK Series

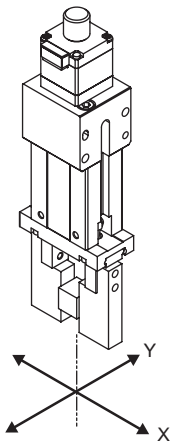
⚠CAUTION

■ The rotation-stop direction cannot be changed. Do not remove the set screw on the rod cover.

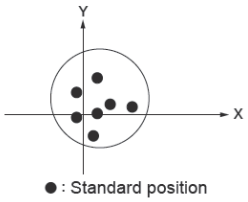
4. DLSH, DCKW Series

⚠CAUTION

■ Repeatability
The repeatability here indicates the displacement of the finger in the case of repeated clamping and unclamping in the same conditions (gripper fixed, same attachment used: see below). Shock during opening and closing may lead to position misalignment of the workpiece and deterioration of repeatability. Note as well that attachment wear or insufficient rigidity may lead to deterioration of accuracy.



Conditions
- Attachment dimensions, shape, weight
- Attachment workpiece gripping position
- Clamp method, length
- Attachment and workpiece contact area resistance
- Fluctuation of gripping force, etc.



■ The amount of backlash has no effect during pressing operation. Backlash may cause misalignment in the position of the finger during positioning operation, so be sure to take the amount of backlash into consideration when setting the position.

■ This finger uses a finite orbit guide. Therefore, when inertia is applied due to travel or rotation, the steel ball moves closer, possibly increasing the sliding resistance or decreasing the accuracy. In this case, perform full stroke operation. (D LSH Series)

■ Apply AFF grease (THK) to the guide rail surface after 6 months or when the number of operational cycles reaches one million, whichever comes first. (DLSH Series)

■ When gripping a workpiece, use only in the closed direction.
If the spring is opened when gripped, excessive force will be applied to the spring, causing breakdown.

■ Be sure to wear protective eyewear when lubricating. (DLSH Series)
If grease scatters and enters the eye, it may cause inflammation.

Safety Precautions

Be sure to read this section before use.

Common precautions: Electric actuator G Series / Controller ECG

Design / Selection

1. Common

⚠DANGER

■ Do not use in places where dangerous goods such as ignitable substances, inflammable substances or explosives are present.
There is a possibility of ignition, combustion or explosion.

■ Ensure that the product is free of water droplets and oil droplets.
Failure to do so may cause fire or malfunction.

■ When mounting the product, be sure to securely hold and fix it (including the workpiece).
If the product falls, is knocked over, or experiences malfunction, it may lead to injury. As a rule, fix the product using all mounting holes.

■ Use a stabilized DC power supply (24 VDC ±10%) for the input/output circuit power supply and the ECG Series motor and control power supplies.
Connecting directly to the AC power supply may cause fire, explosion, damage, etc.

⚠WARNING

■ Use the product in the range of conditions specified for the product.

■ Provide a safety fence to prevent entry to the movable range of the electric actuator. In addition, install the emergency stop button switch as a device in a location which is easy to operate in an emergency situation. For the emergency stop button, use a structure and wiring that will prevent automatic restoration or inadvertent restoration by personnel.

■ It may take several seconds to complete an emergency stop, depending on the travel speed and load.

■ Design a safety circuit or equipment so that damage to equipment, injury to persons, etc., does not occur when the machine stops in the event of a system failure such as emergency stop or power outage.

■ Install indoors with low humidity.
There is a risk of electric leakage or fire accidents in places exposed to rainwater or where there is high humidity (humidity of 85% or more, condensation). Oil drops and oil mist are also strictly prohibited. Use in such an environment could lead to damage or operation failure.

■ Make sure that the product is D type grounded (ground resistance of 100 Ω or less).
If electrical leakage occurs, it may lead to electric shock or malfunction.

■ When installing the actuator in a direction other than horizontal, select the-type with brake.
If the motor is not equipped with a brake, the movable parts may fall off at servo OFF (including emergency stops and alarms) or power OFF, which may result in injury or damage to the workpiece.

■ The brakes are not sufficient to completely retain the actuator in all situations. Be sure to achieve a balanced state or install a mechanical lock mechanism where safety must be guaranteed, such as when performing maintenance in an application where the slider moves with an unbalanced load or when stopping the machine for a long period of time.

■ When vertically installing the actuator, do everything possible to keep the motor on top.
While normal operation with the motor on the bottom will not be problematic, if the motor is stopped for a long time, the grease may separate and flow into the motor, very occasionally leading to malfunctions.

■ Use and store in accordance with the working/storage temperatures and where there is no condensation.
(Storage temperature: -10°C to 50°C, storage humidity: 35% to 80%, operating ambient temperature: 0°C to 40°C (for EBS-G and EBR-G, 10°C to 40°C), operating ambient humidity: 35% to 80%) Otherwise, abnormal stopping or decreased product service life may result. Ventilate in locations where heat may build up.

■ Do not use this product in a location where the ambient temperature could suddenly change and cause dew to condense.

■ Install in a location free from direct sunlight, dust, and corrosive gas/explosive gas/inflammable gas/combustibles, and away from heat sources. Furthermore, chemical resistance has not been reviewed for this product.
Failure to comply may lead to damage, explosion, or combustion.

■ Use and store in locations free from strong electromagnetic waves, ultraviolet rays, or radiation.
Otherwise, malfunction or damage may result.

■ Take possibility of power source breakdown into consideration.
Take measures to prevent bodily injury or machine damage even in the event of a power failure.

■ Take the operational status into consideration if the machine is reactivated after emergency or abnormal stops.
Design the system so that bodily injury or equipment damage will not occur when restarting. If there is a need to reset the electric actuator to the starting position, design a safe control device. Consider the possibility of power failure of the mounted motor. Take measures to prevent bodily injury or machine damage even in the event of a power failure.

■ Avoid using this product where vibration and impact are present.

■ Do not apply a load to the product that is greater than or equal to the allowable load listed in the materials for selection.

■ If there is a risk of bodily injury, install a protective cover.
If the actuator's drive section could cause bodily injury, install a protective cover. Design a structure that prevents person(s) from entering the actuator's operating range or coming into contact with those sections directly.

■ Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠CAUTION

■ Do not use in a range where the moving table, rod or finger could collide with the stroke end.

■ The product is manufactured in conformity with the related standards. Do not disassemble or modify the product.

■ The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

■ Set up the wiring so as not to apply inductive noise.
Avoid locations where large currents or strong magnetic fields are generated. Do not wire together with other large motor power lines (with multi-conductor cables). Do not wire the same as inverter power supplies used for robots, etc. Apply a frame ground for the power supply and insert the filter to the output part.

■ Do not use this product in an environment where strong magnetic fields are generated.
This could cause improper operation.

■ Be sure to separate the power supply of the output of this product and the power supply of inductive loads that generate surges, such as solenoid valves and relays.
If the power supply is shared, surge current may flow into the output and cause damage. If a separate power supply cannot be used, connect the surge absorber directly to all inductive loads in parallel.

■ Select a power supply which provides ample capacity based on the number of installed products. Malfunction may occur if there is no excess capacity.
[For ECG Series]
(□ 35… 2.4 A / base,□ 42... 2.7 A / base, □ 56...4.0 A / base)

■ A fixed cable cannot be used in applications where it is repeatedly bent. Use a movable cable in places where it is repeatedly bent.

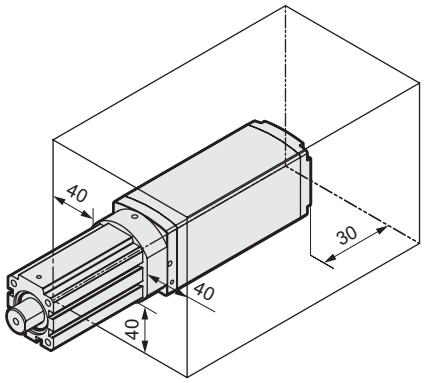
■ Use fixed/movable cables with a bending radius of 51mm or more. (For GCKW Series, bending radius 63mm or more)
Because the bending radius does not apply to bending of the connector part, we recommend fixing near the connector.

■ Use a cable within 10 m to connect the IF connector.

■ The origin position is recognized when the power supply is turned ON. If an external stopper or holding mechanism (brake, etc.) is attached, an unintended position may be recognized as the origin position. Be careful with the layout of the external stopper, etc., so that the origin can be properly detected after the power supply is turned ON.

■ When using GSSD2, GSTK, or GSTG Series, do not apply a magnetic field with magnetic flux density of 0.7 mT or more to the surface of the motor.
This may cause damage or malfunction of the product.

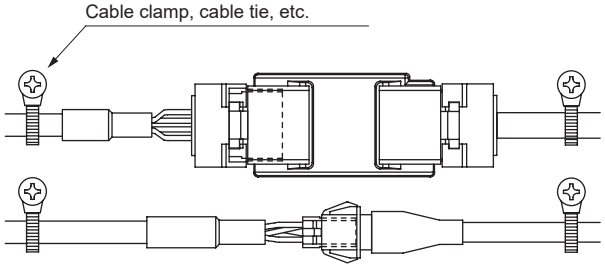
■ When using multiple GSSD2, GSTK, or GSTG Series units, separate the motors by at least the distance shown in the figure below.
Installing them close together may result in malfunction.



■ Do not hold the product's movable parts or cables during transportation and installation.
This may lead to injury or disconnection.

■ Do not fix the cable leading out of the actuator in a pulled state.
There is a risk of damage to the actuator internal parts.

■ Do not move the cable leading out of the actuator. Fix the cable part. Furthermore, use cables with a bending radius of 40mm or more.



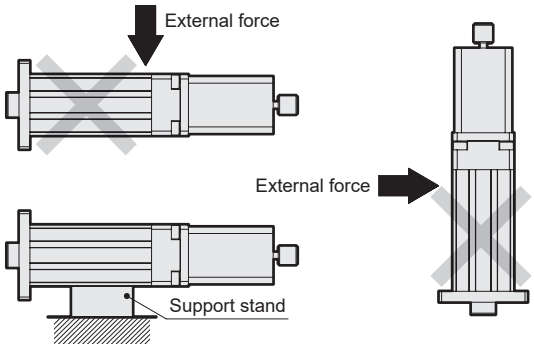
2. GSSD2 Series

⚠CAUTION

■ Do not apply external force to the body when mounting the flange (option). External force may lead to malfunction or part damage.

Install a support stand when front-mounting horizontally. Vibration caused by operation conditions or the installation area could damage the actuator body. If the body will be subject to external force use the mounting holes on its base to fix the body in place. Avoid fixing the flange mounting hole only.

[For flange mounting]



■To avoid damaging the screw on the end of the piston rod and bushing wear and burning, etc., connect the end of the piston rod and load with a floating fitting or simplified floating fitting so twisting does not occur at any position in the stroke.

■If the gap between clevis and the corresponding bearing is large, the pins and shaft will bend. Therefore, keep this gap relatively small.
(Recommended fit: H10/e8)

3. GSTK Series

⚠CAUTION

■When using a stopper actuator to brake loads directly connected to actuator, etc

●The specified range is only for stopping pallets on the conveyor. When using a stopper cylinder to stop loads directly connected to cylinder, etc., because the cylinder thrust is applied as a lateral load, select the actuator within the range of allowable absorbed energy and allowable lateral load.

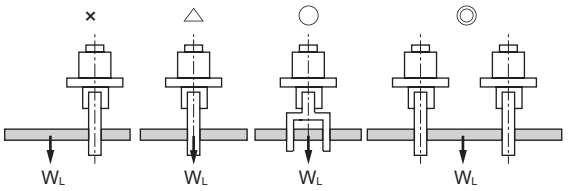
4. GCKW Series

⚠WARNING

■ The gripping force may decrease during a power outage or similar. Use a safe design that takes this into consideration. The gripping force may decrease during a power outage or similar, dislodging the workpiece, so be sure to install a safety mechanism to prevent injury or mechanical damage.

⚠CAUTION

■ When gripping long or large workpieces, stable gripping requires a grip on the center of gravity. Stability is a must when using larger or multiple workpieces as well.

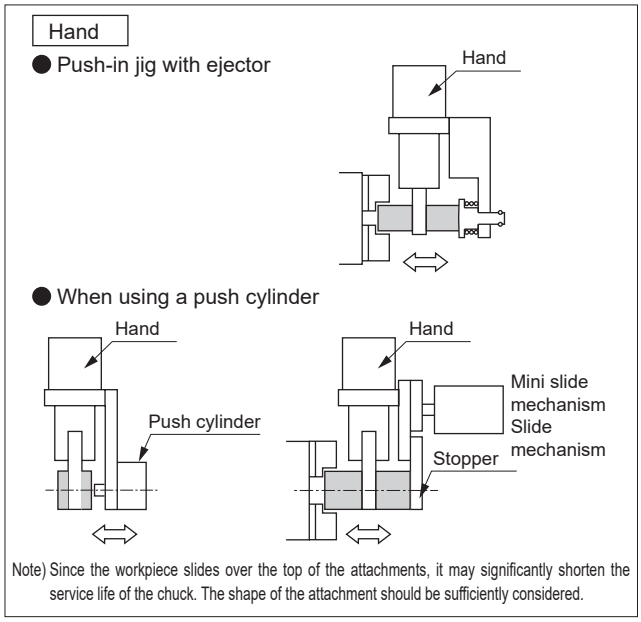


◎: Excellent, ○: Good, △: Conditional, × : NG

■ Select a model that has sufficient power to grip the workpiece weight.

■ Select a model that has sufficient opening/closing width for the workpiece size. The gripping position may become unstable due to variation in the open/close width or the workpiece. When opening after gripping operation, increase the stroke by an amount corresponding to the backlash amount.

■ If directly inserting the workpiece into the jig with the hand, consider clearance during design. The hand could be damaged.



Note) Since the workpiece slides over the top of the attachments, it may significantly shorten the service life of the chuck. The shape of the attachment should be sufficiently considered.

1. Common

⚠DANGER

- Do not enter the operating range of the product while the product is operable.
  The product may suddenly move and may result in injuries.
- The wiring should be in accordance with JIS B 9960-1: 2019 Safety of Machinery - Electrical Equipment of Machines - Part 1: General Requirements. Install an overcurrent protector (a circuit protector or a shutoff mechanism for wiring) for the primary side of the power supply.
- Do not operate the unit with wet hands.
  It may lead to electric shock.
- Fingers and other extremities may be snagged between the body and table when returning to the origin of the GSTG, GSTS, GSTL Series. Please be careful.
- When connecting to a PC, the frame ground (FG) of the PC should not be grounded.
  When using a controller with positive grounding, connecting the controller and peripheral components to the computer with a USB cable risks short-circuiting the DC power supply.
- The Control power supply and power supply are not isolated, so never connect the + and - of the power supply in reverse.
  There is a risk of damage to parts.

⚠WARNING

- Precision parts are built in, so laying the product on its side or applying vibration or impact during transportation are strictly prohibited.
  This may cause damage to the parts.
- For preliminary installation, place horizontally.
- Do not step onto the packaging or place objects on it.
- Avoid condensation, freezing, etc., and maintain ambient temperatures of -10 to 50°C and ambient humidity of 35 to 80% RH during transportation and shipping.
  Failure to do so may cause damage to the product.
- Mount the product on incombustible materials. Direct attachment or mounting to or near flammable materials may cause fire.
  There is a risk of burns.
- Do not step onto the product or place objects on it.
  This may result in falling, knocking the product over, injury due to falling, product damage and/or malfunctions due therein, etc.
- Take measures to prevent bodily injury or machine damage even in the event of a power failure.
  There is a risk of unexpected accidents.
- If the product generates abnormal heat, smoke or odor, turn OFF the power immediately.
  Otherwise, product may result in damage or fire.
- Stop operation immediately when abnormal noise or major vibration occurs.
  Otherwise, product damage or abnormal operation may result.
- Wire the product securely while confirming with this catalog and the instruction manual and ensuring that there is no miswiring or loose connectors. Check wiring insulation.
  Due to contact with other circuits, ground faults and insulation failure between terminals, overcurrent may flow into the product and damage it. This could lead to malfunction or fire.
- Be sure to insulate unused wires.
  Failure to do so may result in malfunction, failure, or electric shock.
- Do not damage the cable, snag it, apply excessive stress to it, or place heavy objects on it.
  Otherwise, poor conduction or electric shock may occur.
- Be sure to perform a safety check of the components' operating range before supplying power to the product. If the product LEDs do not light up when the power supply is turned ON, immediately turn the power OFF.
  Inadvertently supplying power can cause electric shock or injury.
- Before restarting a machine or device, check that measures are taken so that parts do not come off.
- Check that the servo is turned OFF when manually moving the movable parts of the product.
- The movable parts of the equipment may make unintended movements when the actuator servo is turned OFF. When turning the servo OFF, take steps to prevent danger and operate the equipment with full attention to safety.
- Before operating the actuator, check that it will operate safely.

⚠CAUTION

- Regarding installing, setting up, and/or adjusting the actuator, read through the instruction manual and operate correctly.

■ When installing the product, be sure to secure space for maintenance work.
Otherwise, it may not be possible to conduct inspection and maintenance, leading to stoppage or damage of the device or injury during operation.

■ When carrying the product, support it from the bottom.

■ Do not hold the product's movable parts or cables during transportation and installation.
This may lead to injury or disconnection.

■ When transporting or installing the product, ensure sufficient operator safety by supporting the product securely with a lift or support, or by having more than one person working on the product, etc.

■ Do not install in places where large vibration or impact is transmitted.
This may cause malfunction.

■ Do not operate the movable parts of the product with external force or sudden deceleration.
This may lead to malfunction or damage due to regenerative current.

■ When returning to origin, excluding pressing operation, do not hit the mechanical stopper, etc.
This may cause malfunction.

■ Durability varies with transported load and environment. The transport load, etc., should be at a setting well within the margin.

■ Do not apply external force to the actuator during origin return. There is a possibility of misrecognition of the origin.

■ Make sure that no vibration / impact is applied to the movable parts.

■ Install such that no torsion or bending force is applied to the product.

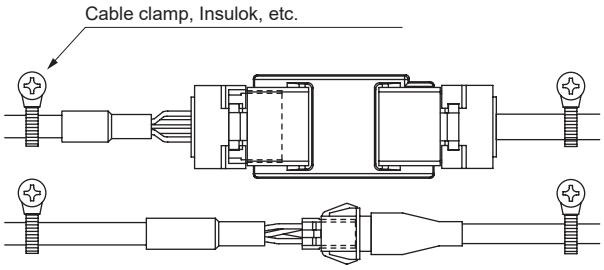
■ When performing electric welding on the equipment to which the product is mounted, remove all F.G. (frame ground) wire connections to the product.
If electric welding is performed with the F.G. connection attached, the product may be damaged by the welding current, excessively high voltage during welding, or surge voltage.

■ Do not disassemble or modify the product.
This may cause injury, accident, malfunction or failure.

■ Do not fix the cable leading out of the actuator in a pulled state.
There is a risk of damage to the actuator's internal parts.

■ Do not bend the fixing cable repeatedly.
If the cable needs to be repeatedly bent, use a movable cable.

■ Do not move the cable leading out of the actuator. Fix the cable part. Furthermore, use cables with a bending radius of 40 mm or more.



■ Avoid use in locations exposed to ultraviolet rays or with atmospheres of corrosive gas or salt.
Otherwise, degradation of performance, abnormal operation or deterioration in strength due to rust may result.

■ Make sure to use the dedicated cable for connecting between the actuator and controller.
Mistakenly connecting another component may cause malfunction or failure.

■ Before adjusting the gain, secure the actuator body to a rigid machine and securely mount jigs and other components as well.

■ When wiring, do not apply excessive force to the connectors.

■ Do not push hard on the controller case.

■ When using a positioning hole, use a pin of dimensions that do not require press fitting. If a pin is press fitted, the load of press fitting may damage or distort the linear guide, lowering the accuracy. The recommended tolerance of a pin is JIS tolerance m6 or less.

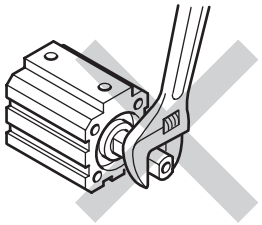
2. GSSD2 Series

⚠CAUTION

■ Do not use the product so as to apply rotation torque to the piston rod.
The bushing for the rotation lock may deform and significantly shorten the service life.

■ Use the product so that load on the piston rod is always applied in the rod axial direction.

■ When fixing a workpiece onto the tip of the piston rod, retract the piston rod to the stroke end and apply a wrench to the section protruding from the rod's parallel section. Tighten so that torque is not applied to the cylinder body.



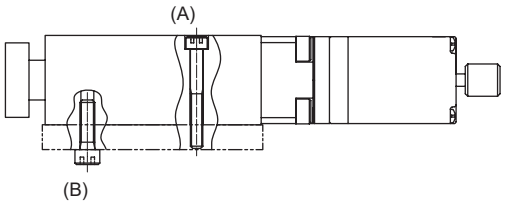
■ When using an external guide, check that it operates smoothly in all positions of the product stroke before installation.

3. GSTG, GSTS, GSTL Series

⚠ CAUTION

■ Do not damage surface flatness by denting or scratching the body (tube) mounting surface or the end plate surface. Make sure that the flatness of the mating surface where the end plate will be attached is, as a guideline, 0.03 mm or below.

■ Tighten the body mounting screws with the appropriate torque.



Item	(A) Mounting from top		(B) Mounting from bottom	
	Usage Bolt	Tightening torque (N·m)	Usage Bolt	Tightening torque (N·m)
GSTG-20	M5	3 to 5.4	M6	3 to 5.4
GSTG-32	M6	5.2 to 9.2	M8	5.2 to 9.2
GSTG-50	M8	12.5 to 22	M10	12.5 to 22

4. GCKW Series

⚠ CAUTION

■ If a lateral load or load with a large impact is applied to the finger, play or damage could occur in the finger. Adjust and check that external force is not applied to the finger.

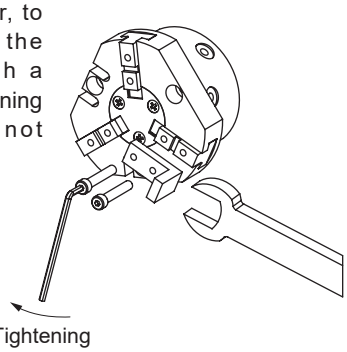
■ Clamping operation is accurate when performed as softly as possible at a low speed. Repeatability is also stable.

■ Regularly grease the sliding section of the finger. Regular replenishment can extend service life further.

■ When installing the attachment, check that a lateral load is not applied to the finger.

■ Attachment mounting method

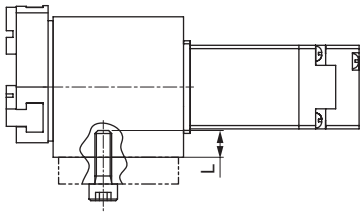
When mounting the attachment to the finger, to prevent any effect on the gripper, support with a wrench, etc., when tightening so that the finger is not twisted.



Item	Bolt used	Tightening torque (N·m)
GCKW-16	M3×0.5	0.59
GCKW-20	M3×0.5	0.59
GCKW-25	M3×0.5	0.59

■ Refer to the following section for body mounting.

● Side mounting



Item	Bolt used	Tightening torque (N·m)	Max. insertion Depth L (mm)
GCKW-16	M4×0.7	1.6	4.5
GCKW-20	M5×0.8	3.3	8
GCKW-25	M6×1.0	5.2	10

■ To remove the workpiece when not energized, use the manual operation plate to open/close the finger, or remove the attachment and then remove the workpiece. Do not apply excessive force to the manual operation plate. Otherwise it could be damaged or malfunction. (Refer to page 237)

Use / Maintenance

1. Common

⚠ DANGER

- Do not operate the unit with wet hands.
  It may lead to electric shock.
- When connecting a computer, do not ground its frame ground (FG).
  When using a controller with positive grounding, connecting the controller and peripheral components to the computer with a USB cable risks short-circuiting the DC power supply.

⚠ WARNING

- Wiring work and inspection should be done by a specialized technician.
- When performing maintenance, inspection and repair, stop the power supply to this product.
  Caution people in the vicinity that a third party should not turn ON the power inadvertently.
- Do not attach or detach wiring or connectors with the power supply ON.
  Failure to do so may cause malfunction, failure, or electric shock.
- For wiring work and inspection, check the voltage with a tester after more than 5 minutes have elapsed since turning OFF the power.
  It may lead to electric shock.
- Mount the product before wiring.
  It may lead to electric shock.
- Make sure that the diameter of the lead wire used for the power cable can tolerate up to 8.6A of current.
  Otherwise, heat generation or damage during operation may be caused.
- Do not connect the product's communication connector to other components.
  Doing so may cause failure or damage.
- Turn OFF the power supply in the event of a power failure. When the power is restored, the product may move unexpectedly and cause accidents.
- Perform a safety check of the components' operating range before supplying power to the product.
  Inadvertently supplying power can cause electric shock or injury.
- Do not enter the operating range while the product is operable.
- Do not touch the product with hands or body during operation or immediately after stopping.
  This may cause burns.
- Do not step onto the product or place objects on it.
  This may result in falling, knocking the product over, injury due to falling, product damage, malfunctions due thereto, etc.
- Take measures to prevent bodily injury or machine damage even in the event of a power breakdown.
  There is a risk of unexpected accidents.
- Before operating from a position where the actuator cannot be seen, confirm that it can be safely operated.
- Check that the servo is turned OFF when manually moving the movable parts of the product.
- If the product generates abnormal heat, smoke or odor, turn OFF the power immediately.
  Otherwise, product may result in damage or fire.
- Stop operation immediately when abnormal noise or major vibration occurs.
  Otherwise, product damage or abnormal operation may result.

⚠ CAUTION

- Do not put fingers or objects into the opening of the product.
  This may cause product damage or injury.
- Do not dent or damage the movable parts.
  This may cause malfunction.
- Do not turn OFF the servo with gravity or inertia applied.
  The product may continue to operate or fall at servo OFF. Be sure to turn OFF the servo in a balanced state without gravity or inertia applied, or confirm safety before proceeding.
- Do not issue a stop command while the product is accelerating or decelerating.
  Doing so may result in a dangerous change in speed (acceleration).
- When operation involves vibration, change the set speed so that vibration does not occur.
- Vibration may occur even within the operation speed range depending on the working conditions.
- Do not disassemble or modify the product.
  This may cause injury, accident, malfunction or failure.
- Ensure proper operation through periodic inspections (2 to 3 times per year).
- When disposing of the product, follow all laws concerning waste processing and cleaning, and be sure to consign the processing to a specialized waste management service company.
- The circuit board inside the product has capacitors connected in between the circuits and the metal body to prevent damage due to static electricity. Avoid withstand voltage and insulation resistance tests on equipment with this product installed. If tests are done, the product will be damaged. If it is necessary for the equipment, remove the product before doing the test.
- If the actuator and controller combination is changed, be sure to confirm the programs and parameters prior to operation.
  Otherwise, there is a risk of unexpected accidents.
- Frequently turning the power ON/OFF can cause damage to the elements inside the controller.
- Use the product in the range of conditions specified for the product.
  The elements inside the controller may overheat and be damaged.
- The relationships between pressing force (gripping force) and pressing rate described in this catalog are merely guidelines. Fluctuation in motor torque, etc., may cause errors even at the same set values.

2. GSTK Series

⚠CAUTION

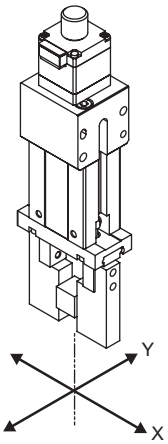
■ The rotation-stop direction cannot be changed. Do not remove the set screw on the rod cover.

3. GCKW Series

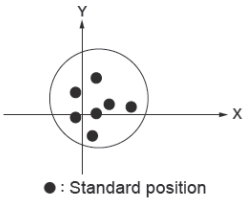
⚠CAUTION

■ Repeatability

The repeatability here indicates the displacement of the finger in the case of repeated clamping and unclamping in the same conditions (gripper fixed, same attachment used: see below). Shock during opening and closing may lead to position misalignment of the workpiece and deterioration of repeatability. Note as well that attachment wear or insufficient rigidity may lead to deterioration of accuracy.



Conditions
- Attachment dimensions, shape, weight
- Attachment workpiece gripping position
- Clamp method, length
- Attachment and workpiece contact area resistance
- Fluctuation of gripping force, etc.



■ The amount of backlash has no effect during pressing operation. Backlash may cause misalignment in the position of the finger during positioning operation, so be sure to take the amount of backlash into consideration when setting the position.

■ When gripping during pressing operation, set the target position with some margin from the stop position. (Include the amount of backlash.)

■ When gripping a workpiece, always use pressing operation . Do not allow the finger or attachment to strike the workpiece during positioning operation or within the positioning range. The feed screw may seize, leading to malfunction.

■ Set the operating torque when releasing the grip to a value larger than the pressing operating torque. If the release torque is low, galling may prevent releasing.

■ If the finger suffers galling due to operation setting abnormalities, use the manual operation plate to open/close the finger. However, do not apply excessive torque to the manual operation plate. Otherwise it could be damaged or malfunction.