Safety Precautions

Always 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 electrically controlled system 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 a safe device is manufactured.

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 in handling.

2 Use the product within specifications range.

This product must be used within its stated specifications. It must not be modified or machined additionally. This product is intended for use as a device or part for general-purpose industrial machinery. It is not intended for use outdoors (except for outdoor type) or for use under the following conditions or environment. (Note that this product can be used under the following conditions only when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

❶ Use for special applications which require the safety, including nuclear energy, railways, aircrafts, marine vessels, vehicles, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency operations (cutoff circuits, opening etc.) circuits, press machines, brake circuits, or safety devices or applications.

❷ Use for applications where life or assets could be adversely affected and special safety measures are required.

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

4 Never remove devices before confirming safety.

❶ Inspect and service on 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 device, be sure to shut down the power supply of the equipment and the relevant power supply, using caution to avoid electric shock.

5 Observe instruction manual and precautions attached the product surely to prevent accidents.

❶ The product could operate unexpectedly during teaching operation or trial operation. Be especially careful not to touch the actuator. If operating the product from a position where the shaft body cannot be seen, be sure to first confirm that the safety is secured even if the actuator moves.

6 Observe precautions to prevent electric shock.

❶ Do not touch the heat sink, cement friction, or motor inside the controller.
These will heat up, and could cause burns. Wait an appropriate amount of time prior to performing inspections or other tasks.
A high voltage is applied until the electrical load stored in the internal capacitors is discharged after the power is turned OFF.
Do not touch for around three minutes after the power OFF.
❷ Make sure to turn the switch on the controller power supply source OFF, before maintenances and inspections.
There is a danger of high voltage electric shocks.
❸ Do not attach or remove connector, while the power is on. Otherwise, this may cause malfunction, failure, or electric shock.

7 Install an overcurrent protector.

The wiring to the driver should be 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 breaker or circuit protector for wiring) on the main power, control power, and I/O power.

(Reference: JIS B 9960-1 7.2.1 General description)
If there is a possibility the circuit current may exceed 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 precautions below to prevent accidents.

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

DANGER: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, and when there is a high degree of emergency to a warning.

WARNING: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

CAUTION: When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation.
Every item provides important information and must be observed.

Warranty

1 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.

However, following failures are excluded from this warranty:

1) Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual.
2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
3) Failure not caused by the product.
4) Failure caused by use not intended for the product.
5) Failure caused by modifications/alterations or repairs not carried out by CKD.
6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
7) Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility confirmation

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

4 Range of service

The delivered product price does not include engineer dispatch service fees. Separate fees will be charged in the following cases.

(1) Instruction of installation and adjustment, and presence on test operation
(2) Maintenance and inspection, adjustment, and repair
(3) Technical instructions and technical education (operation, program, wiring method, safety education, etc.)

Precautions for export

Products and related technologies in this catalog

Those of the products and related technologies in this catalog which are subject to US Export Administration Regulations (EAR) are marked on the product page as "Product subject to the EAR (EAR99) or (EAR99 and 3A991)".

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 EBS/EBR Series/Controller ECR/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 lead to fire or malfunction.
- When mounting the product, be sure to hold and fix it (including workpieces) securely.
  Falling, dropping, abnormal operation, etc., of the product may cause injury. As a rule, fix the product using all mounting holes.
- Use a DC stabilized power supply (48 VDC ± 10% or 24 VDC ±10%) for the ECR Series motor and control power supplies.
  Connecting directly to the AC power supply may cause fire, explosion, damage, etc.
- Use a DC stabilized power supply (24 VDC ±10%) for the input/output circuit power supplies and 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.
- An emergency stop may take several seconds, 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 80% 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).
  Electric shock or malfunction may occur if there is electric leakage.
- 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, 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.
  Chemical resistance of this product has not been taken into account.
  Otherwise, damage, explosions, or fire may result.
- Use and store in locations free from strong electromagnetic waves, ultraviolet rays, or radiation.
  Otherwise, malfunction or damage may result.
- Consider the possibility of power source failure.
  Take measures to prevent bodily injury or machine damage even in the event of a power failure.

■ Consider the operation status when restarting 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 or 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.

⚠CAUTION

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

■ Indicate the maintenance conditions in the device's instruction manual.
The product's functionality may drop too low to maintain an appropriate safety level depending on usage conditions, working environment and maintenance status. With correct maintenance, the product functions can be used to the fullest.

■ Products are manufactured based on compliance with various standards.
Never 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 use the same wiring (with multi-conductor cables) as any large motor power lines other than that of this product.
Do not use the same wiring 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 absorption element 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 margin for the capacity.
(□35: 2.4 A/unit, □42: 2.7 A/unit, □56: 4.0 A/unit)

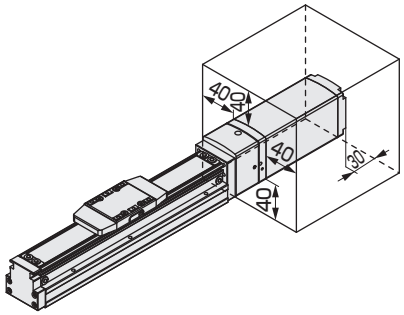
■ A fixed cable cannot be used in applications where it is repeatedly bent. Use a movable cable in places where it is repeatedly bent.

■ Fix the fixed cable so that it does not move easily. Use a movable cable with a bending radius of 63 mm or more.
Because the bending radius does not apply to bending of the connector part, we recommend fixing near the 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.

■ If using EBS-G or EBR-G Series, do not apply a magnetic field with magnetic flux of 0.7 mT or higher to the surface of the motor.
This may cause damage or malfunction of the product.

■ If using multiple EBS-G or EBR-G Series units, separate the motors by at least the distance shown in the diagram.
Installing them close together may result in malfunction.

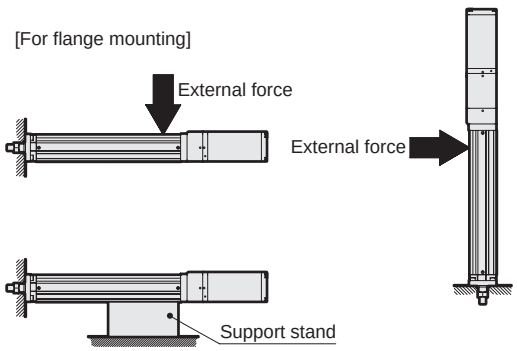


2.EBS Series

■ Check that there is no interference between the workpiece to be mounted on the slider and the motor part.
Some motors are larger than the slider mounting surface height.

3.EBR Series

■ 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.



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: 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.
  This may cause electric shock.
- Fingers and other extremities may be snagged between the motor and slider sections of the EBS Series (slider) during origin return. Please be careful.
- 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

- 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 when transporting and carrying.
  Failure to do so may cause damage to the product.
- Mount the product on incombustible materials. Direct mounting on combustibles or mounting near combustibles 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 damage or fire may result.
- 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 may cause abnormal operation or fire.
- Be sure to insulate unused wires.
  This may cause 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 device's 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.
- When restarting the machine/equipment, confirm that measures are taken to prevent parts from coming loose.
- Check that the servo is turned OFF when manually moving the movable parts of the product.
- The movable parts of the equipment may move unexpectedly 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

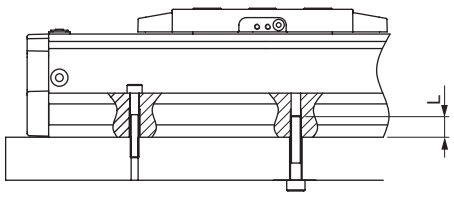
- Regarding installing, setting up, and/or adjusting the actuator, read through the instruction manual and operate correctly.
- When installing the product, be sure to secure space for maintenance work.
  Otherwise, it may not be possible to conduct inspection and maintenance, leading to stoppage or damage of the device or injury during operation.
- Do not hold the product's movable parts or cables during transportation and installation.
  This may lead to injury or disconnection.
- When carrying the product, support it from the bottom.
- When transporting and mounting the product, ensure operator safety by supporting the product with a lift or other supporting tools, or working in pairs or more.

- 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.
  The feed screw could be damaged or 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 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 bend the fixing cable repeatedly.
  If the cable needs to be repeatedly bent, use a movable cable.
- Fix the fixed cable so that it does not move easily. Use a movable cable with a bending radius of 63 mm or more.
  Because the bending radius does not apply to bending of the connector part, we recommend fixing near the connector.
- 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.
- Be sure to use the dedicated cable to connect the actuator and controller.
  Mistakenly connecting another component may cause malfunction or failure.
- Before adjusting the gain, secure the actuator body to the machine and securely mount jigs and other components.

2. EBS/EBR Series

⚠CAUTION

- Do not apply excessive moment to the slider when using the EBS Series (slider).
  This may cause damage or malfunction of the product.
- Make the flatness of the installation surface 0.05 mm/200 mm or less.
- For the EBS Series (slider), ensure that the flatness of the workpiece side attached to the slider is 0.02 mm or less, and do not apply torsion or bending force to the product.
  This may cause damage or malfunction of the product.
- Tighten the body mounting screws with the appropriate torque.



(A) (B)

Descriptions	(A) Mounting from top		(B) Mounting from bottom		
	Bolt used	Tightening torque (N·m)	Bolt used	Tightening torque (N·m)	Min. screw insertion depth L (mm)
EBS-04 EBR-04	M3×0.5	0.63	M4×0.7	1.5	6
EBS-05 EBR-05	M4×0.7	1.5	M5×0.8	3	7.5
EBS-08 EBR-08	M5×0.8	3	M6×1	5.2	9

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

3. Controller ECG

⚠CAUTION

- When wiring, do not apply excessive force to the connectors.
- Do not push hard on the controller case.
- Use a cable within 10 m to connect the IF connector.

Use/maintenance

1. Common

⚠DANGER

- Do not operate the unit with wet hands.
  This may cause 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.
  This 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.
  Failure to do so may cause electric shock.
- Mount the product before wiring.
  Failure to do so may cause electric shock.
- Make sure that the diameter of the electrical wire used for the power cable can tolerate up to 8.6 A of current (up to 4.0 A for ECG Series).
  Otherwise, heat generation or damage during operation may occur.
- Do not connect the product's communication connector to other devices.
  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 device's 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.
  The product may move unexpectedly and cause injury.
- 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 failure.
  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 there is a problem with the timing belt, stop operation immediately and replace the timing belt. Breakage of the timing belt in vertical use is particularly dangerous, so be sure to replace it in a timely manner.
  Check for wear and tear on the teeth or sides, vertically split teeth, cracked or softened reverse, partial disconnection or the like of the timing belt.
- If the product generates abnormal heat, smoke or odor, turn OFF the power immediately.
  Otherwise, product damage or fire may result.
- 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.
  Otherwise, malfunction will occur.
- 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.

■ Deflection or displacement of the steel belt is more likely to occur if slider products are mounted on the wall or ceiling. Continued use in this state may cause trouble, such as breakage of the steel belt. Be sure to conduct daily inspections and adjust the steel belt if there is deflection or displacement.

■ 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).
Refer to the instruction manual for details.

■ The grease lubrication interval is normally 100 km as a guideline.
However, situations may differ depending on working conditions, so determining a lubrication interval based on the initial inspection is recommended. Refer to the instruction manual for details.

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

■ When disposing of the product, comply with laws pertaining to waste treatment and cleaning. Consign it to a specialized waste disposal company for processing.

■ The circuit board inside the product has capacitors connected 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 necessary for the equipment, remove the product before doing the test.

■ If removing the timing belt, follow the procedure and be sure to adjust the origin.
If the origin is not adjusted, the unit may move outside the stroke range and collide with the internal mechanical stopper, causing damage

■ 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.

■ Do not operate the moving table or rod for several seconds after the power is turned ON, as the actuator position is confirmed when the power is turned ON.
The position may not be appropriately confirmed, leading to unexpected operation.

2. Controller ECG

⚠CAUTION

■ Frequently turning the power ON/OFF can cause damage to the elements inside the controller.
Repeatedly energizing and shutting OFF the power can shorten the life of capacitors and other components.
In addition, if there is no more than a 1-second interval between the power being cut OFF and the power being turned ON again, the product may be damaged by the surge voltage.

■ Do not operate in excess of the maximum load capacity.
The elements inside the controller may overheat and be damaged.

■ When clamping during pressing operation, set the position about 5 mm greater than the target stop position.
Otherwise, clamping force may not be generated, depending on the stop position.

■ The relationships between pressing 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.