Safety Precautions

Be sure to read this section before use.

Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

Product-specific cautions: Shock absorber SKL/NCK/SCK/FCK Series

Design/selection

1. Common

⚠WARNING

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

If max. energy absorption in specifications is exceeded, damage or operation faults may occur. Note that the performance listed in the specifications cannot be exhibited if the products are not used with their full stroke.

⚠CAUTION

■ Confirm before use that the product will withstand the working environment.

- Use in conditions exceeding the ambient temperature range will negatively affect durability.
- Do not use in an environment other than atmospheric pressure (vacuum, high pressure).

■ Be careful of splattering due to damage of the cap.

- If used outside the specifications, the cap may be damaged and cause injuries due to the device flying apart.
- Either install a cover to prevent splatter or stand away in a position where safety can be ensured while the master unit is in operation.
- Do not use this product inside clean rooms. Failure to comply may cause contamination of the clean rooms.

■ Confirm the colliding conditions.

- Before use, obtain the colliding speed, colliding object weight, thrust applied to the shock absorber and the number of collisions per minute.

(1) This will also be necessary during calculations for selection. In cases when the colliding speed is less than or equal to the specified range, the shock absorber cannot be expected to perform as well, since it will be more difficult for resistance to occur and the energy absorption will be smaller.

(2) This product cannot be used in cases where the number of collisions per minute will exceed the max. frequency.

■ Check that the surface of the colliding object contacted by the piston rod has a high degree of hardness.

- For types without cap, a high surface compression load will be applied to the contact surface of the piston rod of the colliding object. The contact surface is to have a high degree of hardness (hardness rating of HRC 35 or above).

■ Take note of the returning force of the colliding object.

- When using this product for conveyor drive, etc., it may be pressed back by internal spring force after energy is absorbed. For the return force, refer to the field for the return spring force listed in the specifications.

■ Do not use 2 or more shock absorbers in a parallel arrangement as it will be difficult to synchronize the motion thereof. Absorb the impact with a single shock absorber having a large absorption energy.

■ Use an external stopper or the optional stopper nut at the final stop position of the colliding object so impact is not applied to the body. Impact force on the body may lead to decreased durability or defective return. Confirm before use that the product will withstand the working environment.

■ The max. repetition frequency will differ depending on the ambient temperature.

■ The values provided in the specification descriptions are for use in room temperature (20°C). Note that the specification values will vary depending on the ambient temperature.

Mounting, installation and adjustment

1. Common

⚠ DANGER

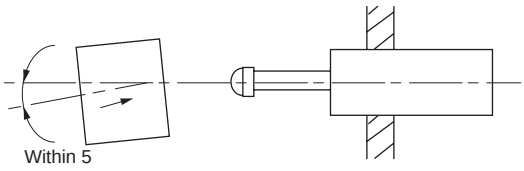
■ Do not use this product near fire or in devices or machines having an ambient temperature exceeding specifications.
The flammable oil in the product poses a risk of fire.

■ Do not place in fire.
Since oil is sealed, this product may explode or ignite if placed in fire.

⚠ WARNING

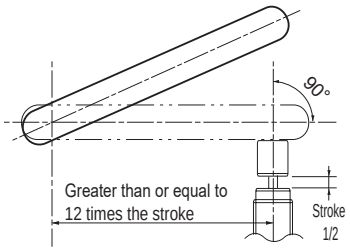
■ Do not apply an eccentric load at a deflection angle of ±A° or more from the center line of the piston rod.

● Collision of a load at a deflection angle of ±A° or more may cause defective return due to the piston rod becoming bent or deterioration of performance due to eccentric wear of the sliding portions.
When using the unit at a deflection angle of ±A° or more, use the optional deflection angle adapter. This will enable use at a deflection angle of up to ±10°. (FCK Series)



	SKL/FCK	NCK/SCK
A	2.5°	5°

● When using rotary motion collision, set the distance from the center of the colliding object's rotation to the shock absorber installation position at 12-fold and over of the shock absorber stroke (3-fold and over when using a deflection angle adaptor). Install so contact is at a right angle at a position half of the stroke.

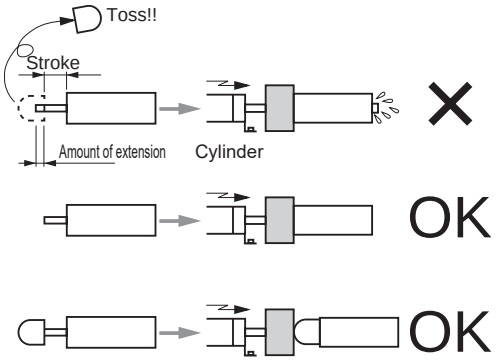


■ Use with mounting parts of insufficient strength is prohibited.

● Operating the unit with mounting parts of insufficient strength may cause damage to the master unit or lead to injuries.
● Ensure that the strength of the mounting parts is at least the max. load multiplied by the safety rate.
(Refer to the max. load. or contact CKD.)

■ Do not remove the cap of the shock absorbers equipped with a cap.

● As the piston rod has been extended in order to mount the cap, use with the cap removed will cause damage to the bottom portion.



■ A guide is required if the colliding object vibrates.
Install a secure guide on the colliding object if the colliding object vibrates or if force is applied to the piston rod at an axial right angle direction.■ When there is the risk of static electricity building up in an explosive environment
Install a grounding device for releasing electrical charge and never use buffering surface materials that may create sparks.

■ Dumping into fire is prohibited.

● Since the oil is sealed, this product has a risk of injury as it may explode or ignite if placed in fire.
● Dispose of the oil according to prescribed methods for processing waste oil.

■ Do not apply a separate external load with a colliding object which has been stopped at the end of its stroke. Additional impact of the external load may lead to damage.

■ Turn device power OFF and confirm the machine is stopped before installing, removing, or adjusting the stroke.

⚠ CAUTION

■ Make sure the tightening torque of the installation nut is in accordance with the following table.

● The shock absorber may be damaged if nut tightening torque exceeds the upper limit in the table below. If the nut is to be securely tightened, use adhesives, etc., to ensure nut tightness.

(SKL Series)

Thread diameter (mm)	M8x0.75	M10x1	M12x1
Nut tightening torque (N·m)	1.2 to 2.0	3 to 4	5 to 6

(NCK Series)

Thread diameter (mm)	M8x0.75	M10x1	M12x1	M14x1.5	M20x1.5
Nut tightening (N·m)	1.2 to 2.0	3 to 4	5 to 6	7.5 to 10	22 to 30

Thread diameter (mm)	M25x1.5	M27x1.5
Nut tightening (N·m)	55 to 70	100 to 130

(SCK Series)

Thread diameter (mm)	M10x1	M12x1	M16x1	M20x1	M25x1.5
Nut tightening (N·m)	3.4	5.4	14.2	70.8	421.7 to 588.4

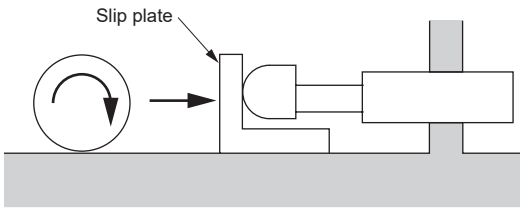
Thread diameter (mm)	M30x1.5	M40x1.5	M45x1.5
Nut tightening (N·m)	149.1 to 196.1	274.6 to 353.0	421.7 to 588.4

(FCK Series)

Thread diameter (mm)	M10x1	M12x1	M14x1.5	M16x1.5	M20x1.5
Nut tightening (N·m)	5.9 to 7.8	5.9 to 7.8	8.3 to 9.8	11.8 to 14.7	29.4 to 35.3

Thread diameter (mm)	M25x1.5 M25x2	M27x1.5 M27x3	M30x1.5	M36x1.5	M42x1.5
Nut tightening (N·m)	49.0 to 61.0	58.9 to 73.5	78.4 to 98.0	98.0 to 122.5	392.0 to 490.0

■ If the rotating objects collide or if deformation or wear is generated between the shock absorber and the colliding object, place protective material over the collision surface to prevent deformation and wear.



■ Do not damage the sliding portion of the piston rod or the threaded portion on the outer diameter of the damper case.
Do not contact or sandwich objects between the piston rod sliding section or outer tube screws O. D. section, or overly screw in fastening screws, etc., causing damage or dents. Scratches or dents on the sliding portion of the piston rod will cause damage of the packing, etc., and may lead to leakage of oil or defective operation. Scratches or dents on the threaded portion on the outer diameter of the outer tube may make it impossible to install the unit on the base or lead to defective operation due to deformation of internal structuring parts.

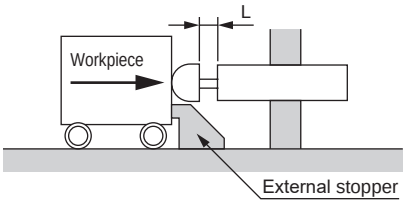
■ Do not use in conditions where oil mist or water drops may contact the rod surface, or in areas with high levels of wear powder. Energy is not absorbed properly and faults may occur.

■ Use without an external stopper is prohibited.

● Operation without an external stopper may damage the main body due to bottoming.

● Operate the unit upon installing an external stopper at the position decided for each model.

	L
NCK	0.5 mm
SCK	2 to 3 mm
FCK	1 mm



■ Installation with other than the tightening torque value is prohibited.

● Installation with other than the tightening torque value may lead to damage of the master unit.

● Do not fix with screws that do not match the mounting holes. This may cause the product to collapse or become damaged.

■ Be careful of detachment of the snap ring.

● If used outside the specifications, the internal pressure of the inner tube in the shock absorber may rise abnormally, causing the snap ring to come off. This may cause inner parts to pop out and cause injury.

● Do not go near the shock absorber during operation.

■ If the device is stored with the rod pushed in, the performance of the air chamber may drop. Do not store with the rod pushed in.

■ Be sure to adjust the adjustable, use at the optimum position.

■ Make sure that the piston rod and the threaded portion on the outer diameter of the tube are not scratched.

● The sealant will become scratched, which may lead to decreased durability or defective return.

2. Adjustment method for the FCK series

⚠ CAUTION

■ To adjust the shock absorber, first set the adjusting dial to “2”, collide, then while observing the status, rotate in the direction of “1” or “3” to the optimum position.

● After setting the scale to an appropriate position, tighten the lock screw before starting use. If the lock screw is not tightened, the adjusted position may deviate and optimum absorption may not be attained.
(However, FCK-L-0.15, FCK-$^{H}_{M}$-0.18, FCK-L-0.3, and FCK-$^{H}_{M}$-0.5 are not provided with a lock screw mechanism.)

● Protect the shock absorber with an external stopper or a stopper nut while making adjustments.
* Adjustment knob 1→2→3 indicates absorbed energy levels of low→medium→high.

● As there are slight variances between individual products, adjust each product to determine the most appropriate adjustment positions.

● The recommended tightening torque for the lock screw is as follows:

FCK-□-0.4, 0.6	0.09 ± 0.01 N·m
FCK-□-1	0.3 ± 0.02 N·m
FCK-□-3 and absorber outer diameter thread size M2O and higher models	0.7 ± 0.03 N·m

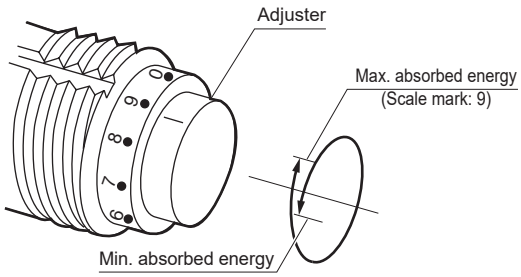
3. Adjustment method for the SCK series

⚠ CAUTION

As products of SCK-**-0.3 and above are equipped with an adjuster, adjust in accordance with the steps below.
As the adjuster is capable of being turned by more than one rotation, when adjusting it be sure to first turn it to the right (clockwise) to the end (max. absorbed energy scale mark) before turning it to the left (counterclockwise) to make adjustments.
The adjuster has a rotation-stop function and locks the position with a detent. Be sure to check that the colliding force is applied when the detent is activated.

*1. The max. energy absorption is attained when the adjuster is turned clockwise to 9, while the min. energy absorption is attained when the adjuster is turned counterclockwise by slightly more than one rotation. Min. energy may vary per product. Be careful, as forcing the adjuster to turn will lock or damage it.

*2. The operation time may become longer or operation may stop midway if the adjuster is not set to an appropriate level.



Use/maintenance

1. Common

⚠ WARNING

■ Disassembly is prohibited.
- Do not disassemble the unit, as doing so may be dangerous.

⚠ CAUTION

■ Careless oil dumping is prohibited.
- Careless disposal of the oil in the shock absorbers will pollute the environment.
- Dispose of the oil according to prescribed methods for processing waste oil.

■ Be careful of irregular vibrations as well as noises due to vibrations.
- If the sound of collision or vibration becomes abnormally loud, replace the unit as it is possible that the service life has been reached. Continued use following such symptoms may lead to damage of the equipment to which the unit has been installed.